THE

# JOURNAL OF GAS LIGHTING,

## WATER SUPPLY, & SANITARY IMPROVEMENT.

[Registered as a Newspaper.]

Vol. XXXII. No. 798.] LONDON, AUGUST 27, 1878. [30th Year.] Price 6d.

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BY
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GENUINE TORBAY PAINT
And SPECIAL GASOMETER PAINT.
Several Prize Medals. Established over 20 Years.
These Paints are now used in over 200 Country Gas-Works, and by all the London Gas Companies, on Gas-holders, Scrubbers, Purifiers, &c. Also used by the Admiralty, War Office, Railway Companies, Founders, &c. They prevent and arrest rust, and protect iron from the action of water, sulphurous and gaseous exhalations; do not crack, blister, or flake off; will cover tar effectually.
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J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts and Fire-Bricks in the Kingdom. Orders for Fire-Clay Retorts of all shapes and dimensions, and to fit any shaped Mouthpiece, Fire-Bricks, and every other article in Fire-Clay, are promptly executed at their Works as above.
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Some of the advantages claimed for this Apparatus are as follow:—

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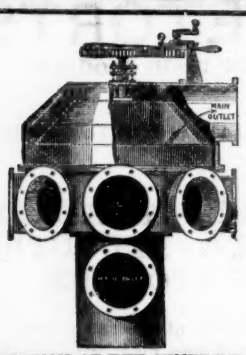
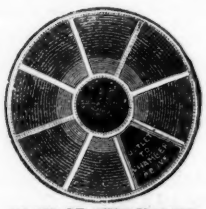
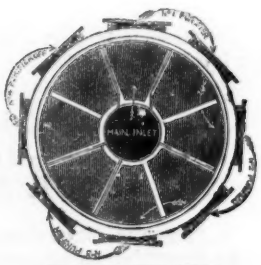



ELEVATION OF THE CENTRE-VALVE.



PLAN OF THE VALVE.




PLAN OF THE BODY.

These PATENT CENTRE-VALVES are the most perfect and certain means for working Purifiers on the system of three in action, and one out of action. The Valve itself is protected from all injury inside the safety cover. The working of the Valve is so easy, and so governed by the stop-catch movement, that the Purifiers can be instantaneously changed in the dark as well as in daylight. They are scraped perfectly true, metal to metal, the facings heretofore exposed are always covered, and there is nothing more reliable, certain, and durable in a gas-works. By their use the floor of the Purifying-house is clear and level; the Valve and all connexions being beneath the floor, out of the way of working. A considerable improvement and saving is effected in the cost of the connecting-pipes.

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They are more easily repaired than any other kind of Valve in use, and can be re-ground in a few hours without removal, and made perfectly gas-tight.

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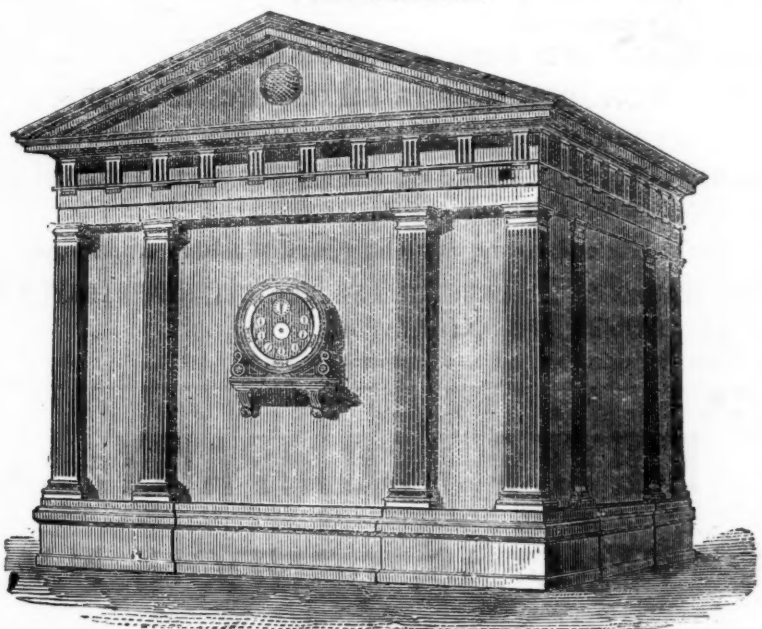

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**GAS COOKING APPARATUS.**

Home and Foreign Orders promptly attended to.

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Which have now been used for fifteen years, and their advantages and durability fully established. They are made entirely by steam machinery in very large quantities at the most moderate cost.

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The NEW PATTERN
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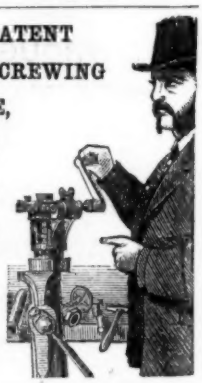
**PORTABLE PIPE SCREWING MACHINE,**



For 1 in., 1¼ in., 1½ in., and 2 in. Gas Threads, complete £7 10s.

In use at the chief gas-works, and giving great satisfaction.

For other useful goods, see Bailey's "Illustrated Inventions," post free 3s. 6d.; gratis to ledger customers.

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**Ornamental, Taper, and Cased Tubes;**

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IN BEST QUALITY TIN-PLATE AND FINE IRON CASES.

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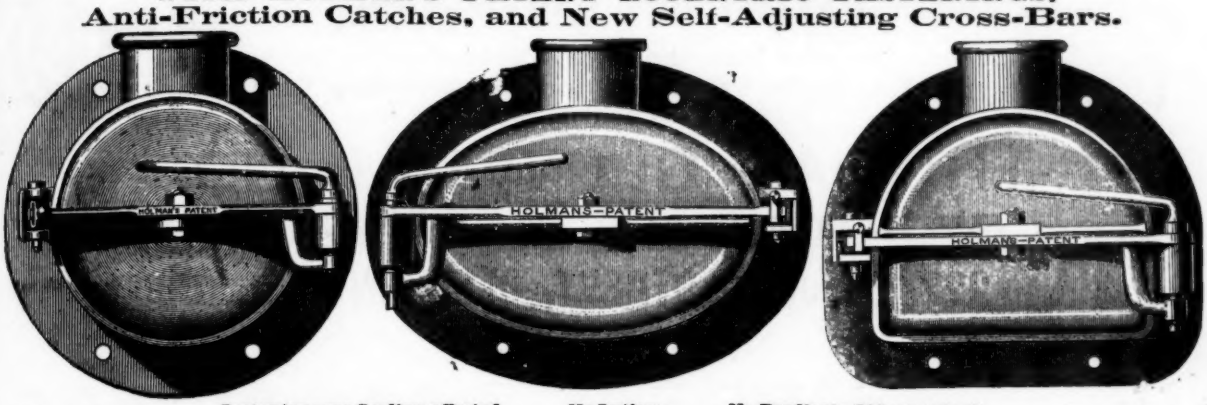
**WITH HOLMAN'S PATENT ECCENTRIC FASTENINGS,**

**Anti-Friction Catches, and New Self-Adjusting Cross-Bars.**




**Instantaneous Sealing effected. No Luting. No Duplicate Lids required.**

**Holman's New Self-Sustaining Cross-Bar ensures freedom of Joint, and maintains parallel position of the Lids.**

Since their introduction in 1869, these Patent Retort-Lids have been thoroughly tested, being now in use in nearly all the principal Gas-Works in London and the Provinces.

**T. B. and H. are now making the "Morton's Self-Sealing Lid" of the SAME FORM OR SECTION AS THE RETORT (see Illustrations above), as well as bringing the Mouthpiece from the D or Oval at back to Circular in front, as heretofore.**

**D and Oval Morton's Lids are working satisfactorily both in this country, on the Continent, and in the United States of America. Among others they have been adopted by the following Gas-Works:—**

**The Gaslight Company's Works, Fulham; Ditto, Bromley-by-Bow; Ditto, King's Cross; Ditto, Shoreditch.**
**And also in the Gas-Works at Richmond, Maidstone, Gloucester, Glasgow, Portsea, Roubaix (France), The Hague (Holland**

## HUNT'S PATENT EQUILIBRIUM GAS-GOVERNOR.

In this Governor a Throttle-Valve is substituted for the ordinary suspended Cone, all external communications being avoided by placing the Lever or Radius Arm (shown in the drawing) inside the Valve-Chamber upon the Disc. The Disc is carried upon steel centres, upon which it is accurately balanced and turns freely. The friction in working is thereby reduced to a minimum. This Governor is extremely sensitive to alterations of inlet or outlet pressure, and renders a large actuating holder unnecessary.

The principal advantages of this arrangement over the ordinary form of Governor are as follows:—

Its sensitive action prevents oscillation.

It is self-adjusting—*i.e.*, it maintains a steady pressure under variations of inlet pressure or a fluctuating consumption.

The inlet to Gasholder being contracted to the smallest possible dimensions, all danger from leakage through insufficiency of seal, tilting, &c., is entirely avoided.

The valve portion being separate from the holder, it can be handled and fixed like an ordinary Slide-Valve direct in the main; and the holder can be placed at an convenient distance immediately above it. The cost is thus materially reduced, and the inconvenience of heavy lifts done away with.

There are no working parts likely to get out of order.

These Governors have been adopted by many leading Gas Companies, among whom are the following:—

The Gaslight and Coke Co. (9), The London Gas Co. (3), and at Abergavenny, Arundel, Birmingham, Cannes (France), Devonport, Dursley, Exeter, Guernsey, Halesowen, Mentone (France), Monmouth, Newcastle-on-Tyne, Oxford, Plymouth, Rochdale, Windsor, &c.

### TESTIMONIAL.

*The Gaslight and Coke Company,*
*9, Water Street, New Bridge Street,*
*Blackfriars, E.C., Feb. 27, 1875.*

MESSRS. TANGYE BROTHERS AND HOLMAN.

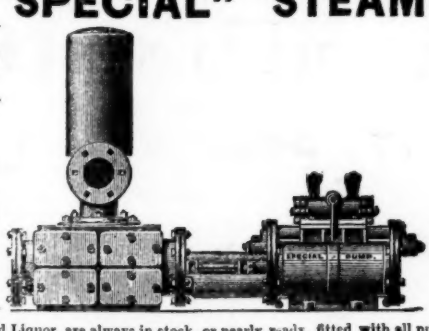
Gentlemen,—The two 24-inch and three 36-inch Hunt's Equilibrium Governors supplied by you, and fixed in the valve-rooms at Whitechapel, Goswell Road, and Blackfriars, are working very satisfactorily.

Yours truly,
(Signed) JOHN JOHNSON.

**PRICES AND FULL PARTICULARS ON APPLICATION.**

## THE "SPECIAL" STEAM-PUMP.

| Diameter of Steam Cylinder. | Diameter of Water Cylinder. | Length of Stroke. | Gallons of Water per Hour, Approximate. | Reduced Prices. |
|---|---|---|---|---|
| 3 | 1½ | 9 | 450 | £16 |
| 4 | 2 | 9 | 815 | 18 |
| 5* | 2½ | 12 | 1,250* | 20 |
| 5* | 3 | 12 | 1,830* | 22 10 |
| 4 | 4 | 12 | 3,250 | 25 |
| 6* | 4 | 12 | 3,250* | 30 |
| 5 | 5 | 12 | 5,070 | 32 10 |
| 7* | 5 | 12 | 5,070* | 40 |
| 6 | 6 | 12 | 7,330 | 40 |
| 8* | 6 | 12 | 7,330* | 50 |
| 7 | 7 | 12 | 9,750 | 50 |
| 10* | 7 | 12 | 9,750* | 65 |



In use in a Hundred Gas-Works in the United Kingdom for Pumping Ammoniacal Liquor, Water, or Tar.

Messrs. Burt, Boulton, and Haywood, Manufacturing Chemists, have over FORTY "Special" Steam-Pumps in use at their several large Tar-Works.

Two Hundred Sizes made. Those in Table opposite are the leading Sizes for use in Gas-Works and Chemical Works.

* These Sizes being usually selected for pumping Tar and Liquor, are always in stock, or nearly ready, fitted with all pump details in iron, and extra length distance-piece between steam and pump cylinder, at a small extra cost.

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London, 1851. New York. 1853. Paris, 1855. London. 1862.

Dublin, 1865.

The SIX MEDALS AWARDED to THOMAS GLOVER for

**PATENT DRY GAS-METERS,**

The latter being the Highest Medal awarded for Dry Gas-Meters by the Imperial Commissioners for the Universal Exhibition, Paris, 1867.

Paris, 1867.

# THOMAS GLOVER & CO.,

## DRY GAS-METER MANUFACTURERS,

## 214 TO 222, ST. JOHN STREET, CLERKENWELL GREEN,

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## THOMAS GLOVER & CO.'S PATENT DRY GAS-METERS,

1st, Are a remedy for all the defects of Wet Meters;
2nd, Are suitable for all climates, whether hot or cold;
3rd, Incur no loss of Gas by evaporation;
4th, Cannot become fixed by frost, however severe;
5th, Are the most accurate and unvarying measurers of Gas;
6th, Prevent jumping or unexpected extinction of the Lights;
7th, May be fixed either above or below the level of the Lights;
8th, Cannot be tampered with, without visibly damaging the outer case;
9th, Will last much longer than Wet Meters;
10th, Will not cost more than one-half for repair that Wet or Water Meters do;
Are upheld for five years without charge.

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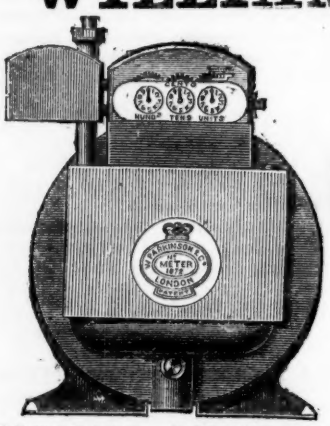
# WILLIAM PARKINSON AND CO.,



(ESTABLISHED 1816,)

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# WET & DRY METERS,

STATION-METERS & GOVERNORS,

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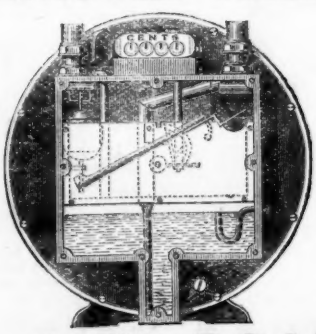
## HUNT'S PATENT IMPROVED COMPENSATING METER.

In this Meter, the action of the measuring-drum is reversed. By this arrangement an improvement is effected in the registration at high speeds, which, in many tests, has not varied from the smallest light to three times the capacity of the meter. It works equally well under all pressures. The range of error between the high and low line is much smaller than that allowed by the "Sale of Gas Act."



The Meter has been critically tested, and most favourably reported upon by official Meter Inspectors in London and Birmingham.

W. PARKINSON and CO. have made arrangements for the manufacture of these Meters, both in tin and cast-iron cases, and for the alteration of old ones to this principle, which is confidently recommended as possessing every quality that can be desired by Gas Companies, Corporations, or Private Consumers.

## COTTAGE LANE, CITY ROAD, LONDON, E.C.

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## TO CORRESPONDENTS.

*No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

M. B. J.—*Your communication published anonymously would produce no effect. With the name appended it might induce Directors to consider your proposal, but we do not see what good is to come of a conference.*

C.—*The question you ask us to publish has been answered in our columns perhaps a dozen times. Quick lime must be added to a solution of the sulphate of ammonia and the ammonia carefully distilled off. For simplicity, the distillate may be neutralized by hydrochloric acid; evaporated to dryness; and the solid residue weighed. A simple calculation will then give the amount of pure ammonia.*


# THE JOURNAL OF GAS LIGHTING,
## WATER SUPPLY, & SANITARY IMPROVEMENT.

*TUESDAY, AUGUST 27, 1878.*


## Circular to Gas Companies.

It is a common belief that Gas Companies, and, we may add, Corporations possessing gas undertakings, are determined opponents of improved methods of illumination. No greater delusion could occupy the public mind. Taking them as they are, the Companies and the Corporations are the purveyors of artificial light. As matters stand at the present moment, they supply an article which is the best that science has yet devised; but they are not at all insensible to the fact that improved means of lighting up our thoroughfares may be discovered, and the action taken by the Chartered Company in experimenting with the Jablochkoff system is a proof that Gas Companies are anxious to completely fulfil the purpose which called them into existence—viz., to supply light. Perhaps, at the present time, the legal right of a Gas Company to supply the electric light does not exist, but it may be taken for certain that, should by any possibility—and we regard the possibility as extremely problematical—the electric light be made generally adaptable, Gas Companies would obtain a statutory right to furnish the new mode of illumination. Parliament would never interfere with or hinder Companies who have so long and faithfully fulfilled their obligations to the public. We are, however, anticipating. Gas is, and we believe will long continue to be, the source from which the general public will derive their illumination. Nevertheless, the Chartered Company are perfectly right in instituting a series of experiments to determine the value and cost of the electric light. The Metropolitan Board of Works and the Corporation of the City of London may follow them if they please; but the fact will remain, that the first public body who commenced a really practical examination of the merits of the electric light was a Gas Company. We take no notice just at present of the exhibition around the Gaiety Theatre in the Strand, for the light shown there can hardly be accepted as a representative electric light. It is agreeable, but wants volume. A gas-flame can easily be seen through the globe, looking, of course, pale and smoky, but still visible. The Loutin light is not, we think, the illuminator destined to extinguish gas in our thoroughfares. It undoubtedly has its merits, among which must be numbered the constancy of the light; but this is not all that is required. If the light cannot be minutely distributed, it is worthless for the purposes of the general public. When a grand centre of electric force has been established, say, in the Horseferry Road, and an infinite number of small copper wires go to thousands of shops and houses, carrying with them the force which is to supply light, day by day and hour by hour, the operator calling and putting the carbon points in position, then, perhaps, gas may be in danger. We have no fear of steam-engines and Gramme's machines established at every street corner, or in the cellars of every alternate house. No effective opposition to gas by electricity can arise until the electric current is made infinitely divisible, and the possibility of this still remains an unsolved problem.

We do not know what progress has been made towards the amalgamations to which we referred last week. In all negotiations of this kind difficulties continually arise, and it is not without long discussion that they are smoothed away, and the track made passable. To our minds the benefits likely to be conferred by the complete amalgamation of all the Metropolitan Gas Companies are so apparent, that we should be much astonished if any Company stood out to resist so manifest an advantage. We know the little jealousies which lie in the way of combination, and we also know that some Directors entertain inflated notions as to the value of the property they govern. Some public spirit and common sense would at once remove all the obstacles, and set the united Company on a common basis for the general advantage of all Shareholders. Metropolitan gas shares are now undergoing unusual variations in value, and the cause, we believe, is the uncertainty which exists as to the course the Companies will pursue. Amalgamation, we have no doubt, would immediately send up the shares, not to the fancy prices they realized some time back, but to what may be called a normal price. A few days will show the turn affairs will take. In the meantime, we think we may assure our readers that the electric light has little to do with the present scare.

The proceedings taken by the Metropolitan Board of Works against the Chartered and the Commercial Gas Companies, for excesses of sulphur impurities, have resulted in the former being fined for two days (£100), and the latter for five days (£250). These repeated convictions will draw the attention of the Companies closer to the need for more thorough and complete sulphur purification. We may take it the requirements of present Acts can be fulfilled by known and practicable means. It is simply a question of expense; and whether the Company shall incur a little more cost for lime or pay forfeitures, is a matter for those it concerns to determine. We notice that, in one case, a foreman was charged with neglect; but as a Company are responsible for the acts of their servants, the consequences of the default remain the same. Pending the great question of general amalgamation, any alteration in the law which relates to impurities is not to be expected; but by-and-by, when Parliament are called upon to consider more particularly gas supply to the Metropolis, we fancy that some alterations will be required in the law as it at present stands. We object to the fixed and unalterable forfeitures. We believe that some discretionary power should be given to the Magistrate to mitigate a penalty as he may feel justified by circumstances. It may be taken as a fact that the Gas Companies are anxious to comply with the law; but, as we see in the case alluded to above, the negligence of a foreman to carry out his instructions resulted in a default, for which the Company were responsible. In such a case, a Jury would, of course, have mitigated the damages claimed, and we think it would be but fair to the Companies to allow them to plead extenuating circumstances.

The Brighton Board of Guardians have at last made up their minds, and determined not to make their own, but to take gas for their Industrial Schools from the Black Rock Company, at

3s. 6d. per thousand cubic feet. We are not informed as to who is to pay the expense of the long line of pipe which will be required to convey the gas from the nearest main of the Company to the schools; but we imagine it will be borne by the Company, who have exhibited great liberality in their dealings with the Guardians.

Our readers know that at last year's meeting of the British Association, a Committee was appointed to examine into the matter of illumination by means of gas. The chief member of the Committee was a Scotchman, and, therefore, it is no wonder that the report presented at the annual meeting of the Association, recently held in Dublin, recommended that cannel coal should be exclusively employed in the production of illuminating gas. We fully appreciate the reasons of the reporter or reporters. Cannel gas has a high illuminating power, and, therefore, light for light, air is less vitiated, and less discomfort is produced by the evolution of heat. At the same time a smaller amount of sulphur impurity is formed, which would be a recommendation to most people. The obstacle to the general employment of cannel gas here in the South is that it would be extremely dear, and it is doubtful how long the supply of cannel coal can be maintained. We advocate common gas of from fourteen to sixteen candle power, a quality which can always be kept up, and which is well adapted for all purposes, whether heating or lighting. We shall presently have the report of the Committee, and shall then probably have more to say on the matter.

The Romford Local Board of Health have, after some hesitation, decided on continuing to light their public lamps with petroleum. It seems to be admitted that gas gives a far better light, and that the petroleum lamps often go out; but the Board are only actuated by a desire to spite the Gas Company, and effect a paltry saving. It is a great pity that the Gas Company could not meet the wishes of the Board; but they know their own business better than we do, and we could not counsel unconditional acceptance of the terms offered.

The Newcastle and Gateshead Gas Company have held their annual general meeting, and the report of the Directors shows that they have had a successful year's working. A dividend of seven per cent. per annum has been declared, and the balance, after the payment of this dividend, allows £2000 to be written off for disused works at Blaydon, and £2500 to be carried to the credit of the renewal-fund, leaving £2826 to be added to the balance of £7206 brought from the previous year. We are happy to see that, notwithstanding the depression of trade, the use of gas is rapidly extending in the Company's district. During the past year 1665 new services have been laid. As the Directors now make a reduction of threepence per thousand feet, it may be anticipated that a still further increased consumption will take place. The manufacture of sulphate of ammonia has been found very profitable with the Company. Extensions of the works and plant are being made, and more are needed, so that the Company will be compelled to apply to Parliament for further powers next session.

The report of the Directors of the Croydon Commercial Gas Company will be found in another place. It will be seen that the profits of the past half year allow for the payment of full dividends; but, as the Company are under the sliding scale, an additional dividend of 15s. per cent. for the half year is declared, all free of income-tax. It must be admitted that in some cases the sliding scale works to the advantage of the Company. How long the public will be satisfied with this operation remains to be seen. We have a constant fear that when high dividends are generally declared the cry will be for lower standard prices.

The Wakefield Gas Company pay standard dividends for the past half year, and carry a small sum to the reserve-fund. It was very properly remarked by the Chairman, at the meeting, that the amount of this fund is very small in proportion to the capital, and that it is highly desirable it should be added to as fast as possible. It behoves Companies, we think, in these days, to increase their reserves, for cheap coal cannot be expected to last, and the only way to maintain dividends is to provide large reserves.

The advantages of cheapening the price of gas are being felt by the Cork Gas Consumers Company, whose rental for the past half year, notwithstanding the reduction made last Christmas, amounted to nearly as much as that in the corresponding half of the previous year. We notice with satisfaction that, by the efforts of Mr. Travers, cooking by gas is now extensively practised in Cork, with the happiest results to the Company and the public. The system of letting stoves on hire is one which we hope will commend itself to many other Companies. The large amount of leakage of gas from the mains is unfortunate for the Cork Company, and we cannot account for so many broken pipes. It seems, however, the defects are being remedied.

The Barnet District Gas and Water Company continue in an improving condition. The consumption of gas goes on increasing, and the water-rental increases in a still larger proportion. The dividends proposed are four and three-quarters per cent. per annum on the A stock and shares, and three and three-quarters per cent. per annum on the B stock. With a district rapidly being built over, the Company may, with a continuation of good times, look forward to an increase in prosperity; but we fear it will be long before full dividends are paid.

Under rather adverse circumstances, the Corporation of Bolton are doing very well with their gas undertaking, and they have raised the quality of the gas, which, to a certain extent, is equivalent to a reduction of price. How far the consumers understand it to be so, we shall not speculate, but we rather expect that the majority would better appreciate a diminution in the charge, especially when we see that the consumers have been taxed to the extent of £6457 for the district rate. There is nothing further which requires notice in the accounts, which are published in another column.

## Water and Sanitary Notes.

Two bodies had recently under consideration our National Water Supply, but looked at it from two somewhat different points of view. The Society of Arts, put in motion by the letter of H.R.H. the Prince of Wales, were thinking mainly of the matter of the supply of drinking water to the whole of the country, while the British Association, under the direction of Mr. Easton, C.E., were considering mainly the prevention of floods and the pollution of streams. The conclusions come to by the several writers who have dealt with the subject are pretty nearly identical. All point to the necessity for a Commission, or Commissions, who shall have the supervision of all our watersheds, and be responsible to Government. It is pointed out that France has a State Water Department, and that Italy also possesses a similar institution. We have no doubt that many very able and elaborate reports have issued from these bodies, but overflows of rivers are still common, both in Italy and France, and occasional droughts are not unknown. It will be the same in this country even if we are blessed with Commissions who will take under their paternal care the charge of our rivers. It is easy to write reports, and to plan works; bus the latter have to be paid for, and the British ratepayer it impatient of taxation. The Italians and French no less dislike taxation, but centralization leaves them no option but to pay. Mr. Easton's idea, to have Conservancy Boards for every separate watershed, has been advocated for years in the columns of this JOURNAL. It is the one most consonant with our national instinct, and falls in with our principle of local self-government. The Commission, which was recommended by a number of essayists to the Conference of the Society of Arts, would be somewhat different. A purely governmental supervision is advised, which would, in the first instance, begin by mapping out all our rivers, and all their contributory brooks and springs. We have said before that this work has already been done by the Ordnance Survey Department, and we confess we see no necessity for any further investigation on that score. The geological formations of all our principal watersheds are also well known to every instructed man in these islands. What undoubtedly is wanted is what Mr. Easton pointed out—namely, that engineering skill shall be brought into operation to make our rivers what Nature intended them to be—natural drains—preventing the evils which result from leaving them uncontrolled. A large amount of money is almost annually lost by the disastrous floods which result from overflows. These are preventible; but the difficulty lies in settling the incidence of the taxation which must pay for the necessary works. We see here, in this Metropolis, how great the difficulty is, when the question is simply who is to pay for the prevention of floods within the metropolitan area. What a huge difficulty it would become if it were proposed to execute works along the whole valley of the Thames or the Severn, may be easily imagined.

It must not be supposed, however, that we are entirely opposed to the constitution of these commissions. If appointed and the work be ably done, a considerable store of knowledge will be laid up, which may bear fruit in future generations, There is, as Mr. Easton states, a vast amount of information already acquired, which simply requires collecting and collating, and put in a useful form. We look somewhat appalled on the pile of blue and other books which now contain a mass of information for chemists and engineers who deal with our water system, and we long for the man or the men who will put it into a compendious and readily accessible shape. If a Government

Commission will do this, let it by all means be appointed, and the work be proceeded with forthwith.

There is a probability after all, that the opposition of the Severn Commissioners to the scheme of the Liverpool Corporation for impounding the River Verniew will be much modified, if not altogether withdrawn; for, upon further consideration, it seems many of the Commissioners, and notably the Chairman, have been convinced that the scheme will not have the disastrous effects which were at first anticipated. The salmon spawning-ground, it is expected, will be rather improved than otherwise, while the summer freshes will be added to, not diminished, by the overflow from the bywash, and the compensation water. Under these circumstances, we may expect that the Bill which the Liverpool Corporation will promote next year will go forward, although it may be anticipated that some opposition will be made by towns along the river.

It seems to be a question in Liverpool whether or not the consent of a town's meeting under the Borough Funds Act will be necessary to sanction the carrying out of the scheme above mentioned. It appears that during last session the Liverpool Corporation obtained powers to promote a Bill with surplus funds, but we cannot suppose that this will apply to such an important measure as that to sanction the new water scheme. It is argued, we notice, in local papers, that the ratepayers having elected their burgesses, they have confided to them all the powers that are requisite for carrying on the business of the borough; but when the expenditure of a million and a half or two millions is in question, it becomes a serious matter. When a very important State question arises, a dissolution of Parliament results; but a Municipal body cannot be dissolved. The vote at a town's meeting under the Borough Funds Act is virtually an expression of confidence or want of confidence in a Council, and we hope that nothing will interfere with the action of that important and valuable enactment.

The voting-papers for the poll on the Thirlmere scheme will be issued to the ratepayers of Manchester on the 6th prox., and will be collected on the 10th. We hope that a very unanimous expression of opinion will be made by the ratepayers, who are greatly indebted to the Council for the step they have taken with a view to provide such an important and valuable supply of water. A common agreement at Manchester will tend to counteract the sentimental opposition which will, of course, be again brought forward.

We are glad to learn that an arrangement has been come to by which an amalgamation will be effected between the Durham Water Company and the Weardale and Shildon Water Company. The scheme at present needs confirmation by the Shareholders of the two Companies, and also by Parliament; but we feel satisfied that neither will be refused. The result will be that the city of Durham will receive a supply of pure water, which will satisfy all who objected to the old source.

After having been long exercised as to the disposal of the sewage of Torquay, the Local Board decided on adopting the recommendation of Sir Joseph Bazalgette to carry it out to sea by means of a channel three miles in length. The work has been of an extremely difficult character, much of it consisting of boring through hard rock. A contractor broke down, and the Board then resolved to complete the work themselves. It has now been successfully completed, and what is called an inaugural ceremony took place last Saturday. Torquay has a very high repute as a health resort. Whether the invalids who visit it will be greatly improved in condition by the new system of drainage, we shall not attempt to predict; but it speaks well for the enterprise and consideration of the inhabitants that this great work for the locality has been brought to so satisfactory a conclusion.

How important the functions of a Government Commission are may be gathered from the fact that Her Majesty's Inspectors of Fisheries paid a visit to Hereford last Wednesday, to inquire into the mischief which had been done by the bursting of that creosote tank lately on the Great Western Railway. They saw tar on the gravelly shallows of the River Wye, and obtained specimens of the fish killed, which they brought back to London to be "critically examined." This reads rather farcical; but the Inspectors came out subsequently with the practical recommendation that the Home Secretary should be asked to direct Railway Companies to be more careful when they carry gas tar.

The lower greensand has been pierced at Chatham Dockyard, at a depth of 903 feet, and a most copious supply of water has been obtained. This will encourage those who advocate more extensive efforts to reach this stratum, which is generally regarded as a huge reservoir of pure and wholesome water under the Metropolis.

## Correspondence.

*[We do not hold ourselves responsible for the opinions expressed by Correspondents.]*

### NAPHTHALINE.

SIR,—In your issue of the 13th inst., M. Brémond says that he did not reply to my last letter because it was inconvenient for him to follow the discussion on the ground on which it was laid by his adversary, unless his slight knowledge of the English language had caused him to misinterpret my meaning. He does not very clearly indicate the changed circumstances which have taken place since the appearance of my letter in your pages, and which have induced him to reply now. Perhaps he will kindly explain this in his next.

Allow me, in the meantime, to assure M. Brémond that my object in writing you was very similar to the object which you had in view in referring to his paper—viz., to point out that, in my opinion, his deductions from the results of his experiments, and his theory of the synthetical formation of naphthaline from the elements of the gas, were erroneous.

M. Brémond now asserts that he never tried to refute the laws established by M. Regnault, and that the law which he formulated was quite distinct from them. Now, in my opinion, not only did he, in the most explicit manner, deny the existence of M. Regnault's laws, but, in support of his theory of the formation of naphthaline from the elements in the gas, it was absolutely essential that he should do so. This will be evidenced from his original paper, in which he makes the following statement:—

"The question, therefore, remained just as it had been put to me—Does naphthaline pre-exist in gas or not? Some further observations and additional experiments, necessitated by a considerable production of naphthaline in the works under my direction, led me, I believe, if not to the categorical reply to this question, at least to the discovery of another cause for the production of naphthaline, and, consequently, of the means of preventing its production. But what these observations and experiments led me to believe is, that if naphthaline pre-exists in the gas *after the condensing and purifying apparatus have been passed (which I do not believe)* its deposition is due to a physical phenomenon; and if it does not pre-exist after the gas has undergone purification, its deposition is due to a chemical phenomenon.

"Now, these observations and experiments bear upon one single point—viz., that naphthaline is produced wherever there is a condensation of the aqueous vapour contained in the gas; and its deposition is preceded by this phenomenon of the condensation of the water; and that gas absolutely deprived, as far as possible, of aqueous vapour (for the absolute drying of a gas is very difficult to realize) does not deposit naphthaline under the ordinary conditions of temperature and pressure.

"If, then, naphthaline pre-exists in the gas after its purification, if its crystalline deposit is due to a physical phenomenon, if that crystallization is preceded by the condensation of the aqueous vapour contained in the gas, it obeys a law which might be thus expressed:—In a mixture of several vapours, when one of these vapours attains its point of condensation, it displaces the point of condensation of the vapour with which it is mixed. *Up till now this law has neither been laid down nor verified.* I have submitted it to the judgment of experienced physicists, and I am authorized to say that it is at this moment the subject of study by a learned professor of physics, of whom I have the honour of being a friend, and whom I cannot otherwise designate than by saying that he is the Superintendent of the Laboratory at the College of France.

"*I abandon this hypothesis, and return to that of the non-pre-existence of naphthaline in the gas, which is the one I admit.*"

Now, the physical phenomenon to which M. Brémond refers is just the law relating to the tension of mixed vapours clearly enunciated by Regnault, and which, you will observe, M. Brémond distinctly states has been neither laid down nor verified, and which he therefore abandons in favour of his theory of the chemical production of naphthaline from the elements present in the gas. How can M. Brémond reconcile such a statement as that and the one which he makes in his present letter, that he never did deny that M. Regnault's law explained the precipitation of naphthaline?

Further on in the same paper M. Brémond says:—

"To recapitulate, the production of naphthaline is due to the distillation of coal at high temperatures, *but it is entirely dissolved by the contact of the gas with tar and the light oils contained therein.* The production of naphthaline varies with the character of the coal used; the constituent elements of the gas made from these coals likewise differ. The more a species of coal is found to contain, as constituent elements, illuminating gas, marsh gas, ethylene, acetylene, styrolene, and anthracene, the greater will be the proportion of naphthaline produced in the distillation of that coal. *The production of naphthaline, after the purification of the gas, is due to reactions which I shall call 'intimate,' which are produced in the different constituent elements of the gas, the condensation of the aqueous vapour giving rise to them;* or, at any rate, these reactions do not take place, and therefore naphthaline is not deposited, when the gas is entirely deprived of vapour of water. . . *It is this process, an application of the theories above set forth, that I have patented.*"

From the foregoing extracts it will be evident that M. Brémond's process is founded upon the theory that the naphthaline deposited in the gas-mains and services is not an educt, but a product from the gas; that it does not pre-exist in the gas prior to the precipitation of the water vapour, but that it is produced from the elements in the gas by the latent heat given out by the condensing water vapours—or, as he puts it, the phenomenon of naphthaline deposit is a chemical and not a physical one, such as would be capable of explanation by the laws relating to the tensions of mixed vapours—and, therefore, he most emphatically denies M. Regnault's laws.

One would have thought that the experiments which you advised M. Brémond to make would have convinced him most conclusively that he was in error in attributing the cause of naphthaline deposit to a chemical phenomenon. I *know* that he could not have made these experiments without being convinced of this. Were he to admit that the deposit is due to the physical cause referred to, he would also be compelled to admit that his process and that of Mr. H. Aitken are substantially identical.

M. Brémond will excuse me for correcting his description of Mr. Aitken's process. Mr. Aitken does not, as he states, manufacture gas in a manner peculiar to himself. According to Mr. Aitken's process, in

its simplest form, the gas is manufactured in the usual way, with the sole exception that, instead of allowing the tars to absorb the hydrocarbon vapours (as is the case where ordinary forms of condensation are employed), he uses an improved mode of condensing, whereby the hydrocarbons generated in the retorts are left in the gas. He adds no hydrocarbons from any other source, and the gas is desiccated to prevent precipitation of the hydrocarbons by sudden changes of temperature; the whole process being based upon the laws verified by M. Regnault, and which, so far as their influence in the precipitation of hydrocarbons from coal gas is concerned, I maintain, as previously shown, were most emphatically denied by M. Brémond in his original paper.

M. Brémond draws attention to the fact that in Mr. Aitken's process there is no allusion made to naphthaline. "The word," he says, "is not even mentioned." That is perfectly true. Mr. Aitken makes no particular allusion to it, nor to the other hydrocarbons, such as benzol, parabenzol, toluol, zylol, cumol, cymol, &c., nor to many other hydrocarbons not only belonging to the benzol, but also to the olefiant and the marsh gas series. All he says is that he desiccates the gas, in order to enable it to retain in diffusion the vapours of "volatile hydrocarbons," and surely M. Brémond will not deny that naphthaline it a hydrocarbon.

I shall conclude this letter, as I did my last, by again referring M. Brémond to Mr. Aitken's specification. He will there find that Mr. Aitken has a distinct claim for the desiccation of gases to prevent the precipitation of hydrocarbons from the gases, *irrespective of how they are prepared;* and a further perusal of Mr. Aitken's specification, and of my last letter, will show him that he is continuing to commit a blunder in attributing to Mr. Aitken any desire to lay claim to the discovery of the fact that the presence of aqueous vapour in gas reduced its illuminating power, the fact having been known long previous to the date of the report of the London Gas Referees, that water vapour reduced the illuminating power, not only by means of the cooling effect on the flame, as pointed out by "Selenium" in your issue of Dec. 11 last, but also by its undergoing decomposition during the combustion of the gas, the oxygen of the aqueous vapour combining with, and consuming, the carbon of the hydrocarbons without incandescence, and thus also reducing the luminosity of the gas. Mr. Aitken makes no such claim. What he *does* claim to have discovered, or, at least, to have been the first to apply, is the fact that by desiccating gases they will sustain being exposed to a much lower temperature without a precipitation of the hydrocarbon vapours taking place.

WM. YOUNG.

*Clippens Oil Works, Paisley, Aug.* 15, 1878.

## THE VARYING LUMINOSITY OF BANDS OF GAS-FLAMES.

SIR,—Having given much attention to the development of the illuminating power of coal gas with different burners, and under varying conditions of combustion, I beg to offer some remarks, founded on my own experiments, in regard to Mr. Methven's proposal to determine the illuminating power from a single band or cross section of a gas-flame. He proposes to take the brightest part of the flame—which is, doubtless, the best or most convenient mode of procedure; but, in so far as his plan is correct, I think it will become obvious that *any* part of the flame (if adopted as the standard) would equally serve his purpose.

Mr. Sugg, developing the principle of Lowe's jet photometer with his well-known painstaking ability, holds that the illuminating power of a gas-flame from a jet, and also, if I mistake not, from an Argand, can be adequately determined by the length or height of the flame. Mr. Methven's plan, although differently applied, depends upon the same principle. If the illuminating power of gas-flames is proportionate with their height, it follows that with all of such flames there must be a fixed gradation of luminosity—the flames must be mutually homogeneous; for, were it not so, an increase of height would be no measure of their illuminating power. This is especially manifest as regards Mr. Methven's plan, wherein one particular band or section of the flame is taken as correctly indicating the illuminating power of all the other parts. He says, in substance (unless I misunderstand him): "Ascertain, by means of the photometer, the amount of light given by a square inch (or thereabouts) of the brightest part of the flame, and that will indicate correctly the illuminating power of the whole flame." Since the photometer has to be appealed to, it seems to me that there can be no advantage in this process, and also that the ordinary process of dealing with the whole flame is more likely to be correct, as certainly it will be more generally satisfactory to the public than to deal merely with a band of the flame, and therefrom calculate the illuminating power of the entire flame.

But, be this as it may, the fact which I desire to call attention to, and which I ascertained by careful experiments, is the variations in the luminosity of bands of gas-flames according to the conditions of combustion. In the two above-mentioned methods for determining the illuminating power—one by the length of the flame, and the other by a section of its brightest part (both of which, as it seems to me, proceed upon the same *principle*)—it is stated, or assumed, that the gas must be burnt "under the best conditions." This of itself is a difficulty, because it is impossible to tell whether a gas-flame is at its best, save by means of the photometer; and if you have to vary the height of the flame until the photometer shows that the flame is at its best, would it not be much better to stop there than thereafter commence a new testing upon a particular part of the flame?

My experiments showed that when gas is burnt under the best conditions for developing its illuminating power, that is not the time when it yields the brightest band or section. The experiments which I made upon this point, and upon many others in connection with gas combustion—are given in a report on "Gas-Burners and the Principles of Gas Illumination," issued by the Gas Referees, and which was not merely composed, but prepared in every part by myself. That report also contains the experiments by which I ascertained the increase of illuminating power obtained by desiccating the gas—a fact which, as M. Brémond says, was "unknown before," but which has been claimep twice over as a discovery since then.

Although, as stated in that report, and generally adopted, a gas-flame may be said to be at its best when it is just on the point of smoking, this is not absolutely correct. When experimenting with Argands of the best kind—Sugg's "London" Argands—I found that the maximum illuminating power was obtained at a clear interval before the smoking point, as the subjoined record of experimenting will show.

In making this branch of my experiments—namely, designed to test the *intensity* of the light from gas-flames, as shown by the brightest zone or band of the flame—I employed Sugg's "London" Argand, No. 1 (the standard burner), consuming 5 feet per hour of nominally "16-candle gas," but really of a slightly higher quality. To begin at the beginning, I first employed the burner without a chimney, the result being a dull, waving, and highly smoking flame, 8 inches in height, and yielding only two-thirds (66 per cent.) of the maximum illuminating power obtainable, and afterwards obtained. I then put on a chimney, 6 inches by 1¾ inches, when the flame still smoked, but gave within 2 per cent. of its maximum light. Next, I put on a 6-inch by 2-inch chimney, when the flame still smoked slightly, and increased one-fifth of a per cent. in illuminating power. In the fourth experiment, I put on a 6½-inch by 2-inch chimney, when the flame *entirely ceased from smoking*, but still fell short of its maximum illuminating power by 1·3 per cent., while the height of the flame was 4 inches—only one-half of what it was without a chimney. In the next experiment, a 7-inch by 2-inch chimney was employed, when the height of the flame fell to 3·6 inches, but yielded the maximum light obtainable from it—*i.e.*, 100. In five subsequent experiments, I continued to increase the height of the chimney, the height of the flame gradually falling until it was only 2·5 inches, and the illuminating power decreasing to 84·57. Thus, while the height of the flame fell 35 per cent., the illuminating power fell only 15½ per cent., showing that the intensity or brightness of the flame was much increased.

Expecting this result, while making this series of experiments I placed in front of the flame (as Mr. Methven now does) a metal plate with a horizontal aperture, about half an inch in depth, which I raised or lowered in each experiment, so as always to keep it on a level with the brightest part of the flame, the rest of the flame being hidden from the photometer-disc by the metal plate. The results obtained from the whole series of these experiments were as follows—the *highest* illuminating power of the whole flame, and also of the narrow band of flame, being represented as 100:—

| Size of Chimney. | Height of Flame. | Illuminating Power of the Entire Flame. | Varying Intensity of the Narrow Band of Flame. |
|---|---|---|---|
| Without chimney. | 8 inches. | 66·00 | 29·3 |
| 6 by 1¾ inches. | Smoked. | 98·00 | 82·0 |
| 6 „ 2 „ | Smoked slightly. | 98·20 | 82·6 |
| 6½ „ 2 „ | 4·00 inches. | 98·70 | 83·7 |
| 7 „ 2 „ | 3·60 „ | 100·00 | 90·0 |
| 7½ „ 2 „ | 3·25 „ | 99·20 | 92·9 |
| 8 „ 2 „ | 3·00 „ | 96·70 | 94·7 |
| 9 „ 2 „ | 2·75 „ | 92·10 | 97·1 |
| 10 „ 2 „ | 2·60 „ | 87·90 | 98·9 |
| 11 „ 2 „ | 2·50 „ | 84·57 | 100·0 |

The *actual* illuminating power yielded by the band of flame (a cross slit, 0·54 inch deep), and also of the whole flame, was respectively as follows, showing that the light from the band by no means corresponded with that of the entire flame:—

| Experiment. | Band of Flame. | Whole Flame. |
|---|---|---|
| 1 | 10·36 | 66·00 |
| 2 | 35·04 | 98·00 |
| 3 | 35·28 | 98·20 |
| 4 | 35·76 | 98·70 |
| 5 | 38·44 | 100·00 |
| 6 | 39·69 | 99·20 |
| 7 | 40·44 | 96·70 |
| 8 | 41·47 | 92·10 |
| 9 | 42·25 | 87·90 |
| 10 | 42·77 | 84·57 |

As I have not seen any similar experiments, I think these may prove interesting, and, as regards Mr. Methven's proposal, instructive. It will be observed that I do not question that Mr. Methven's plan will fulfil its purpose, but it seems to me to require more carefulness and trouble than the ordinary process of dealing with the light of the entire flame.

R. H. PATTERSON.

22, *Wingate Road, Hammersmith, Aug.* 22, 1878.

## GAS PURIFICATION.

SIR,—I have only to-day had the opportunity of reading, in your JOURNAL of the 30th of July, the paper read by Mr. F. Livesey, on the 19th of June, at the British Association of Gas Managers, and from the discussion which followed I am tempted, through your pages, to contribute my quota towards the desired end—the purification of gas in closed vessels.

I am satisfied this can be done, and when I was with the Alliance Company in Dublin, I made some experiments in that direction; but circumstances have since prevented me from carrying them further, and I am at present unable to continue them; but, as some Engineers or Managers may have opportunity, they may think it worth inquiring into and trying them.

After the gas has passed through the washers or scrubbers, instead of passing into the usual purifiers filled with *dry* oxide of iron or lime, as the case may be, the gas is made to pass into a series of scrubbers—say in the form of those made by Mr. Anderson, as most likely to keep a solution in agitation; but, instead of being supplied with water, let a weak solution of oxide of iron into the scrubber, and the gas scrubbed with it, which will take up the sulphuretted hydrogen, and the solution will pass down from tank to tank until it exits through a 3-inch pipe into a tank (having a division in the centre) into which the pipe dips and seals.

This tank to be provided with an air agitator, and covered over; the air blown in from an exhauster, and the fumes conveyed away and destroyed. A Jacob's ladder, or chain-pump, would lift the solution

from the bottom tank to a top one, which would supply any number of scrubbers required. Two, four, or eight may be placed around one large tank, according to the make of gas. The process to go on with the alternate fouling and revivifying until the oxide is fully charged with sulphur, when the contents of the tank are to be removed, a new charge of solution run in, and the process repeated.

What is aimed at is purifying gas from sulphuretted hydrogen and other sulphur compounds, and a certain per centage of carbonic acid (after the ammonia-sulphur process of Mr. Livesey) by means of a weak solution of oxide of iron in closed vessels—running the fouled solution into revivifying-tanks, where it is agitated with air, and made ready for use again.

This would be a much more simple and inexpensive process than the one recently patented; and that a weak solution of natural bog ore does take up sulphuretted hydrogen I proved some five years ago, and also that it can be revivified by agitation. I only wish I had an opportunity of demonstrating it; but, failing that, others might try it, then we shall have purification in closed vessels complete.

JOHN SOMERVILLE.

*Gas-Works, Kilkenny, Aug.* 19, 1878.

[We scarcely understand what the writer means by a weak solution of oxide of iron. This oxide is completely insoluble in water. Probably it should be read, "a thin mixture of oxide of iron and water"—that is, a little oxide stirred up with the water.—ED. J. G. L.]

## STOPPAGES IN INLET-MAINS TO GASHOLDERS.

SIR,—I am exceedingly obliged by the suggestions of your correspondents for the removal of a very disagreeable difficulty, though, unfortunately, neither of them is applicable to my particular case.

I got rid of the obstruction by the persistent use of boiling water. I have a valve upon the main conveying gas to the holder, and my suction-pipe from the bottom of the inlet extends to about 7 inches above the level of the inlet-main within the gasholder. I first closed the valve, and then persistently poured boiling water down the suction-tube until it suddenly ceased to overflow, and sank to the level of the top of the main inside the holder; when I knew that the obstruction had been removed, and the way was clear. Another 200 gallons, to make assurance sure, and I have not since been further troubled. "7."

## THE EXHIBITION OF GAS APPARATUS AT WOLVERHAMPTON.

SIR,—I notice in your JOURNAL of the 20th inst. a letter from Messrs. John Wright and Co., making a series of charges against the judges at the Wolverhampton Exhibition of Gas Apparatus. Those charges, as one of the judges, I unhesitatingly say are false, and the remarks on the subject contained in your leader do the gentlemen concerned a grievous wrong.

Had the judges yielded to the request of Mr. Wright, sen., and excluded his most formidable rivals, Messrs. Billing and Co. and Messrs. Hassal and Singleton, from participating in the prizes, that gentleman's inordinate ambition for medals might have been gratified, and the judges commended by him for their discrimination and fairness. The allegations of Mr. Wright have been thoroughly investigated by the Exhibition Committee, and their Chairman, Alderman Edwards, writes the enclosed letter to the Editor of the *Birmingham Daily Post.*

*Bilston Gas-Works, Aug.* 24, 1878. J. S. REEVES.

[ENCLOSURE.]

*Wolverhampton, Aug.* 20, 1878.

Sir,—The Committee of the Industrial Exhibition at the Molineux Grounds, Wolverhampton, having had their attention called to a letter that appeared in your issue of Friday last,* from the firm of Messrs. John Wright and Co., of Birmingham, will feel obliged by your inserting the following reply:—

Since their interview with the deputation of exhibitors referred to in the letter, they have carefully gone into the whole matter, and examined every one of the allegations contained therein, and find in each case they are entirely at variance with facts. They fully agree with the awards of the judges; and, as the best proof that they were correct in their decisions, the public have indorsed that opinion by the purchase of the stoves of the chief successful exhibitors more extensively than any others.

On behalf of the Committee, I remain, Sir,

Yours respectfully,

WILLIAM EDWARDS, Chairman.

SIR,—We should be glad to be permitted to make a few remarks on the letter of Messrs. John Wright and Co., in your JOURNAL of the 20th inst.

We exhibited two heating-stoves, one for gas, the other for coke and coal. They were the same we exhibited at Birmingham, and obtained a silver medal from the Corporation of Birmingham, in competition with Messrs. Wright and Co. and others. We kept both of these stoves burning the whole time till after the award of the judges.

Messrs. Wright and Co. were aware we were competing for the silver medal against all comers. They also stated to us that Mr. M'Gregor had informed them that the same programme adopted at the Birmingham Exhibition would be followed, and the same classes for competition, so they knew there would be a competition in gas heating-stoves, yet for six days before the judges came round they never lighted the gas in any of their heating-stoves, and we concluded they did not intend to compete, knowing their stoves could not succeed any more than in Birmingham, where the judging was very strict.

The judges at Wolverhampton found all the other gas-stoves but ours of an ordinary kind, and they could hardly single out any one of them for a medal; but the stove we exhibited was very different, and presented principles they could not ignore or pass by, and, being novel—they had never seen anything like it before—they gave the medal for the peculiar merits of the stove, and we think you will agree with them when you hear what we effect with this stove.

We combine the following advantages—viz., great heating power, so that we can warm a room, 21 feet by 17 feet, to 60° in half an hour in midwinter; we take away all the vitiated air as it is produced, and we introduce a full supply of pure fresh oxygenated air, warm, into the room, thus producing constant circulation and perfect ventilation; we prevent all cold draughts, making the room equal in temperature in every part, and in giving these combined advantages we effect a saving of at least 60 per cent., as against the consumption and cost with an ordinary fire-grate.

We are prepared to substantiate all these advantages at any time, in any practical way, and we hardly feel content to sit down under the letter of Messrs. Wright and Co. without placing our side of the case before the public.

A silver medal is not of much moment, as we know we can secure that in any future competition with any stove yet before the public, but the judges gave the medal for the merits of the stove, after seeing and knowing all the kinds of gas-stoves yet introduced.

THOS. D. CLARE AND CO.

*Handsworth, Birmingham, Aug.* 24, 1878.

* This is the same letter as appeared in last Tuesday's JOURNAL.—ED. J. G. L.

# Legal Intelligence.

## HAMMERSMITH POLICE COURT.—THURSDAY, AUG. 22.

(*Before Mr.* BRIDGE.)

METROPOLITAN BOARD OF WORKS *v.* THE GASLIGHT AND COKE COMPANY.

In this case The Gaslight and Coke Company were sued by the Metropolitan Board of Works, under section 51 of their Act of 1876, to recover penalties for supplying gas from their Kensal Green works, on the 27th and 29th ult., of less purity than it ought to have been, under section 30 of the Act.

Mr. SPENCER, from the offices of the Metropolitan Board of Works, attended in support of the summons. He said that the Company admitted the excess of sulphur impurity, which did not arise from any fault of the Company, but from that of their foreman, who had been dismissed. The Company had very properly come forward to pay the penalty, which was £50 for each day.

There being summonses for two days, a bank-note for £100 was handed in, and the cases were settled.

## WORSHIP STREET POLICE COURT.—FRIDAY, AUG. 23.

(*Before Mr.* BUSHBY.)

METROPOLITAN BOARD OF WORKS *v.* COMMERCIAL GAS COMPANY.

In this case the Commercial Gas Company were sued by the Metropolitan Board of Works for penalties, under section 47 of their Act of 1875, for having supplied gas, on the 22nd, 23rd, 24th, 25th, and 26th of July, at their testing-station, 12, Parnell Road, Old Ford, and other places, of a less purity than allowed by section 29 of the Act.

Mr. SPENCER appeared for the Metropolitan Board of Works, and said that the penalty was £50 each day.

The SOLICITOR who appeared for the Company admitted the facts, submitting to a conviction.

The full penalty on each summons, making in all a fine of £250, was then imposed.

SYDNEY (NEW SOUTH WALES) GAS-WORKS.—We have pleasure in announcing that Mr. Thomas James Bush, the eldest son of the late Mr. Thomas Bush, who was for many years Accountant to The Gaslight and Coke Company, has received the appointment, advertised in the JOURNAL on the 30th ult. and 6th inst., of Engineer to the Australian Gaslight Company, Sydney, New South Wales. Mr. Bush was a pupil of Mr. F. J. Evans, and served under him for three years at the Horseferry Road works of the Chartered Gas Company. In 1864 he was appointed as an assistant to the Engineer at those works, a position which he retained until about eight years ago, when he was promoted to be Deputy-Engineer at Beckton. Having been at these works from the very commencement, he has gained great experience in construction and management; so that a more competent man could hardly be found to superintend one of the most important gas establishments at the Antipodes. Mr. Bush will leave England about the middle of September, and will carry with him the hearty good wishes of very many of our readers.

NORTH BRITISH ASSOCIATION OF GAS MANAGERS.—We have been asked by the Secretary (Mr. W. Mackenzie) to state, in reference to the remarks of Mr. Nelson, reported in last JOURNAL, page 283, that as soon as Mr. Davidson, of Glasgow, has completed his experiments with the "Graduatory Method of Condensing, Washing, and Purifying Coal Gas by a Combined System of Rotary Apparatus," on which subject Mr. Nelson was to have read a paper at the recent meeting, the results will be embodied in a circular, a copy of which will be sent to every member of the Association.

SALES OF GAS SHARES.—On Tuesday, the 13th inst., there were sold by auction 20 new shares of £10 each, issue 1877, in the Richmond (Surrey) Gas Company. The first five were sold for £66, the second five for £65, the third for £67, and the fourth for £68, thus realizing an average premium of 33 per cent. On the following day 31 £10 shares, fully paid up, and receiving 10 per cent. dividend, in the Ringwood Gas Company were sold, and realized £17 per share.

INSTITUTION OF CIVIL ENGINEERS.—Twelve months ago the Council put forward a list of subjects upon which, among others, original communications were invited for reading and discussion at the ordinary meetings, or for publication alone in the "Minutes of Proceedings." At the same time it was stated that premiums would be awarded to the authors of meritorious papers, out of special funds assigned for the purpose, the income of the several trusts being—the Telford Fund, £260; the Manby Donation, £10; the Miller Fund, £180; and the Howard Bequest, £16. The awards for the past session are as under:—Telford Medals and Telford Premiums to Dr. Higgs and Mr. Brittle, for their joint paper on "Dynamo-Electric Apparatus," and to Mr. T. C. Clarke, of Philadelphia, for his description of "Iron Bridges of Large Span for Railway Traffic." Watt Medals and Telford Premiums to Messrs. Davey, B. Leslie, and Holt, for papers on "Direct-acting Pumping Engines," "The Hooghly Floating Bridge," and "Review of the Progress of Steam Shipping;" and Telford Premiums in respect of essays on "The Evaporative Power of Locomotive Boilers," to Mr. Longridge; "The Centrifugal Pump," to Mr. W. C. Unwin; "The Main Drainage of Paris," to Mr. Target; "Irrigation in the South of France," to Mr. G. Wilson; "The Works of the Bilbao Iron Ore Company," to Mr. Barron; and "The Egremont Ferry Landing," to Mr. Carson. It is mentioned that Mr. B. Leslie has previously received a Telford Medal, and Mr. Longridge and Mr. Unwin both Telford and Watt Medals. The Manby Premium has been bestowed upon Mr. E. Bazalgette for his account of "The Victoria, Albert, and Chelsea Embankments of the River Thames." The Miller Scholarship, of the annual value of £40, and tenable for three years, has been adjudged to Mr. W. B. Dawson, B.A. and B.A. Sc., of M'Gill University, Montreal, for a description of "The Eastern Canal of France;" while Messrs. Britton, Hurtzig, Moss, and Szlumper receive Miller Prizes. The Howard Quinquennial Prize, to the inventor of a new and valuable process relating to the uses and properties of iron, has fallen to Mr. Bessemer.

# Miscellaneous News.

## METROPOLIS WATER SUPPLY.

The Registrar-General publishes the following returns of the average daily quantity of water supplied by the London Water Companies during the month of July. According to these, 147,960,686 gallons, or 672,253 cubic mètres of water (equal to about as many *tuns* by measure, *tons* by weight) were supplied daily; or 270 gallons (122·7 decalitres), rather more than a *ton* by weight, to each house, and 38·0 gallons (17·3 decalitres) to each person, against 35·2 gallons during July, 1877.

| Companies. | Number of Houses, &c., supplied in July, 1877. | July, 1878. | Aver. Daily Supply of Water in Gallons* during July, 1877. | July, 1878. |
|---|---|---|---|---|
| Total supply | 535,478 | 547,987 | 133,684,630 | 147,960,686 |
| From Thames | 251,269 | 258,497 | 67,610,360 | 75,266,172 |
| „ Lea and other Sources | 284,209 | 289,490 | 66,073,670 | 72,694,514 |
| THAMES. | | | | |
| Chelsea | 28,741 | 29,014 | 8,819,600 | 9,505,400 |
| West Middlesex | 49,462 | 50,896 | 11,298,597 | 11,540,934 |
| Southwark and Vauxhall | 78,530 | 81,000 | 19,350,000 | 25,196,388 |
| Grand Junction | 37,683 | 38,462 | 12,793,963 | 13,838,650 |
| Lambeth | 56,853 | 59,125 | 15,348,200 | 15,184,800 |
| LEA AND OTHER SOURCES. | | | | |
| New River | 125,585 | 126,987 | 29,104,000 | 31,779,000 |
| East London | 113,192 | 117,084 | 28,946,200 | 31,456,792 |
| Kent | 45,432 | 45,419 | 8,023,170 | 9,458,722 |

* Including that for manufactures and for various purposes other than for domestic consumption.

*Note.*—The return for July, 1878, as compared with that for the corresponding month of 1877, shows an increase of 12,509 houses, and of 14,276,656 gallons of water supplied daily.

Dr. Frankland reports, as the result of his analyses of the waters supplied to the Metropolis during July, that taking the average amount of organic impurity in a given volume of the Kent Company's water during the nine years ending Dec., 1876, to represent unity, the proportional amount of such impurity in an equal volume of water supplied by each of the other Companies, and by the Tottenham Local Board of Health, was:—Tottenham 1·4, Kent 1·5, Colne Valley 1·7, New River 2·6, Southwark 3·3, Chelsea 3·8, West Middlesex 4·3, East London 4·6, Grand Junction 5·0, and Lambeth 5·9. The waters drawn from the Thames by the Chelsea, West Middlesex, Southwark, Grand Junction, and Lambeth Companies, and from the Lea by the East London Company, though somewhat less impure than the previous month, were still much below their usual summer quality. The Chelsea, Southwark, Grand Junction, and Lambeth Companies waters were slightly turbid, but the remaining samples of river water were efficiently filtered. Moving organisms were seen in the Southwark Company's water, and fungoid growths in that of the Chelsea Company. The water abstracted from the Lea by the New River Company was of much better quality than that of any other Metropolitan Company drawing its supply from rivers. The deep well water delivered by the Kent and Colne Valley Companies, and by the Tottenham Local Board, was bright, wholesome, palatable, and of its usual excellent quality. The temperature of the water delivered by the seven Companies drawing their supplies from rivers varied from 17·3° C. (63·1° F.) to 20·3° C. (68·5° F.). The temperature of the water drawn from deep wells by the Kent and Colne Valley Companies did not exceed 13·4° C. (56·1° F.) Seen through a stratum two feet deep, the water supplied by the Kent and Colne Valley Companies, and by the Tottenham Local Board, was clear and colourless; that supplied by the New River Company very pale yellow; the West Middlesex and East London Companies water was pale yellow; the Chelsea, Southwark, and Grand Junction Companies water slightly turbid and pale yellow; and that supplied by the Lambeth Company slightly turbid and yellow.

*Results of Analysis expressed in Parts per* 100,000.

| Companies or Local Authorities. | Total Solid Matters. | Organic Carbon. | Organic Nitrogen. | Ammonia. | Nitrogen, as Nitrates and Nitrites. | Total combined Nitrogen. | Chlorine. | Total Hardness. |
|---|---|---|---|---|---|---|---|---|
| *Inner Circle.* | | | | | | | | |
| Thames— | | | | | | | | |
| Chelsea | 26·88 | ·190 | ·036 | 0 | ·147 | ·183 | 1·5 | 19·1 |
| West Middlesex | 26·98 | ·205 | ·047 | 0 | ·105 | ·152 | 1·5 | 19·7 |
| Southwark | 27·58 | ·169 | ·029 | 0 | ·140 | ·169 | 1·5 | 19·4 |
| Grand Junction | 28·00 | ·240 | ·055 | 0 | ·153 | ·208 | 1·5 | 18·5 |
| Lambeth | 24·22 | ·313 | ·037 | 0 | ·079 | ·116 | 1·4 | 17·7 |
| Other Sources— | | | | | | | | |
| New River | 26·36 | ·137 | ·019 | 0 | ·110 | ·129 | 1·5 | 19·1 |
| East London | 27·70 | ·240 | ·035 | 0 | ·103 | ·138 | 1·6 | 20·3 |
| Kent | 44·68 | ·078 | ·014 | 0 | ·604 | ·618 | 2·6 | 29·0 |
| *Outer Circle.* | | | | | | | | |
| Colne Valley | 16·70 | ·079 | ·021 | 0 | ·328 | ·349 | 1·5 | 8·4 |
| Tottenham Local Board | 48·88 | ·060 | ·023 | 0 | ·535 | ·558 | 3·4 | 30·0 |
| Corporation of Birmingham* | 20·20 | ·372 | ·081 | ·004 | ·143 | ·227 | 1·5 | 12·0 |
| Corporation of Glasgow† | 2·70 | ·117 | ·016 | 0 | ·005 | ·021 | 0·55 | ·79 |

* Analyzed by Dr. Alfred Hill, Medical Officer of Health and Analyst to the Borough.
† Analyzed by Dr. E. J. Mills, F.R.S., of Anderson's College, Glasgow.

*Note.*—The numbers in the analytical table can be converted into grains per imperial gallon by multiplying them by seven, and then moving the decimal point one place to the left. The same operation transforms the hardness in the table into degrees of hardness on Clark's scale.

LLYNVI VALLEY GAS COMPANY.—The report of the Directors of this Company for the six months ending June 30 last, presented at the meeting of Shareholders on the 16th inst., stated that the balance to the credit of the revenue account was £282 4s. 7d., which would admit of a dividend at the rate of 6 per cent. per annum for the past half year, free of income-tax. This would absorb £276, and leave a balance of £6 4s. 7d. to be brought forward. The Directors regretted the reduced dividend, which had been brought about by the continued depression and almost paralyzed state of the industries of the district, and the endeavour of the Company to somewhat meet their customers by the great reduction in the price of gas—6d. per 1000 feet to all consumers, and another 6d. to large consumers, such as the Local Board, who now paid only 4s. The Directors, however, had every reason to anticipate a considerably increased consumption with an improved state of trade.

## LIVERPOOL UNITED GAS COMPANY.

The Half-Yearly Meeting of this Company was held last Tuesday—Mr. J. A. TINNE in the chair.

The Directors report was as follows:—

The Company's accounts which are now presented to the Proprietors show the revenue for the year ending the 29th of June last to have been £402,782 5s. 2d., and the expenditure £325,233 2s. 6d., leaving an available surplus of £77,549 2s. 8d., from which £33,971 6s. has been taken for payment of the dividend declared last February; out of the balance (£43,577 16s. 8d.) the Directors recommend that a dividend be declared for the half year ending the 30th of June last at the rate of 5 per cent. on the ordinary consolidated stock of the Company, and at the rate of 3½ per cent. on the consolidated B (7 per cent.) stock, and on the amount paid up in respect of the £7 10s. shares.

The Directors have used their best endeavours to effect an amicable adjustment of the Dock Board's claim against the Company on account of the fire at the landing stage, but they regret to state that the negotiations have not resulted in a settlement, and the matter has consequently been referred to the arbitrament of J. Edwards, Esq., Q.C.

On the motion of the CHAIRMAN, seconded by Mr. J. G. MORRIS, the report and statement of accounts were unanimously adopted.

The CHAIRMAN then moved the declaration of dividend in accordance with the recommendation contained in the report.

This was seconded by Mr. D. OWEN BATESON, and carried unanimously.

The retiring Directors and Auditor having been re-elected, the Rev. T. GARDNER moved a vote of thanks to the Chairman and Directors for their satisfactory management of the affairs of the Company.

The resolution was unanimously agreed to.

The CHAIRMAN, in responding, said it was unnecessary to add anything to the report, which, though brief, comprehended everything that had taken place with regard to the affairs of the Company during the past year. He could only hope that in the ensuing year the affairs of the Company would go on as well and as smoothly as, on the whole, they had done in the past year.

## BOURNEMOUTH GAS AND WATER COMPANY.

The Half-Yearly Meeting of this Company was held on Friday last, at the Offices, 90, Cannon Street—Mr. ROBERT HUDSON in the chair.

The SECRETARY (Mr. W. Cash) said the following report and statement of accounts would be taken as read:—

The Directors, in submitting the accompanying statement of accounts, have pleasure in being able to report some improvement in the business of the Company during the half year.

Compared with the corresponding half of 1877, there is an increase of £1233 7s. 10d. in the total receipts. The net profit amounts to £3889 1s. 5d., and your Directors recommend that for the last half year the dividend should be at the rate of 7 per cent. per annum on the original and B shares.

The Bill which the Company promoted in the present session of Parliament, and to which the Proprietors gave their assent last February, has been passed, and has received the Royal Assent.

DR.—*Revenue Account, for the Half Year ended June* 30, 1878.

| | | | |
|---|---|---|---|
| To Manufacture of gas— | | | |
| Coals, including all expenses | £2240 19 1 | | |
| Purifying materials, oil, water, and sundries | 22 15 0 | | |
| | | £2,263 | 14 1 |
| Salaries of Manager and Officers | £255 9 6 | | |
| Wages and gratuities | 543 9 6 | | |
| Repairs and maintenance of works and plant (including renewal of retorts), materials, and labour (including pumping) | 1204 10 3 | | |
| | | 2,003 | 9 3 |
| Reconstruction of works account—amount written off | | 500 | 0 0 |
| Distribution of gas and water— | | | |
| Repair, maintenance, and renewal of mains and of service-pipes, including materials, laying and paving, and labour | £403 4 2 | | |
| Repairing and renewing meters | 132 0 10 | | |
| | | 535 | 5 0 |
| Rents, rates, and taxes— | | | |
| Rents | £44 13 3 | | |
| Rates and taxes | 299 6 10 | | |
| | | 344 | 0 1 |
| Management— | | | |
| Directors allowance | £200 0 0 | | |
| Salary of Secretary and office-rent | 100 0 0 | | |
| Stationery and printing | 52 18 6 | | |
| General establishment charges and incidentals | 118 13 0 | | |
| Auditors | 21 0 0 | | |
| | | 492 | 11 6 |
| Law charges | | 11 | 1 4 |
| Bad debts | | 39 | 7 0 |
| Depreciation of office furniture | | 11 | 1 4 |
| Total expenditure | | £6,200 | 9 7 |
| Balance carried to profit and loss account | | 4,265 | 8 5 |
| | | £10,465 | 18 0 |

CR.—*Revenue Account.*

| | | | |
|---|---|---|---|
| By Sale of gas— | | | |
| Private rental— | | | |
| Common gas, at 6s. 6d. and 6s. per 1000 cub. ft. | £5814 10 3 | | |
| Public rental and under contracts | 301 12 8 | | |
| Rental of meters | 220 2 9 | | |
| | | £6,336 | 5 8 |
| Water-rental | | 3,412 | 16 7 |
| Residual products— | | | |
| Coke, less labour and cartage | £400 15 2 | | |
| Breeze, ditto | 72 10 1 | | |
| Tar, ditto | 132 3 0 | | |
| Ammoniacal liquor, ditto | 38 2 0 | | |
| | | 643 | 10 3 |
| Rents | | 71 | 13 0 |
| Transfer fees | | 1 | 12 6 |
| | | £10,465 | 18 0 |

The CHAIRMAN: I beg to move the adoption of the report and accounts that have been presented to you. In doing so, I shall not detain you long, because my friend Mr. Mead has kindly undertaken to second this motion, and I am sure you would rather hear from his lips the progress we have made during the last six months. I desire, however, to acknowledge how much the Board feel indebted to that gentleman for the time and attention he has given to the working of the Company, to which I can assure you those who have witnessed it can bear ample testimony. I can only say that the fruits of that labour are beginning to show themselves.

Mr. MEAD: Our friend the Chairman has been good enough to call upon me to second the adoption of the report, and I have great pleasure in doing so. I will avail myself of this opportunity of saying a few words to you on the past, the present, and the probable future of this Company. Many of you are doubtless aware that for some years I have criticized rather adversely the action of the Board. It always appeared to me that we had a very splendid business if properly conducted, and my contention was that the Shareholders were not getting the dividends they were rightly entitled to. I was very careful, in making the statements that I did from time to time, never to make one that I was not practically prepared to prove. I took a great deal of pains to ascertain the position

of things before I came and made any complaints in this room. I need hardly say that this adverse criticism was a long way from being a pleasant duty to myself; nothing but the urgency of the case induced me to persevere in it. Well, gentlemen, that culminated in a proposal from Mr. Godley to appoint a Committee of Inquiry to thoroughly investigate the affairs of the Company. That Committee held a number of meetings. Before being appointed, you will remember, an old member of the Board told you it would be a very expensive business. However, the Committee were appointed, they held a large number of meetings, and I have no hesitation in saying (and I think the balance-sheet will bear me out) that you never passed a resolution more calculated to benefit the interests of the Company than the resolution that you passed for the appointment of that Committee of Inquiry. I think the Committee will agree with me when I say that every statement I have made was amply borne out by their inquiries. It is perhaps desirable not to go back—not to say too much about what was done previously. That is done, and we had better let it be done with. We are more interested now in the present state, and the probable future condition of our Company, than in what has been done in former times. We cannot alter what has been done; we must do the best we can with what is before us. Gentlemen, after you left this room at the last general meeting, one of the old Directors retired from the Board, and we then elected a member of the Committee of Inquiry to the seat that this gentleman had resigned. We elected Mr. Charles Newton for two reasons—one was that he was conversant with gas companies accounts, and another that he was one of the Directors of several very successful Gas Companies; in fact, I think that he was elected a member of the Committee of Inquiry on that very account. After the election of this Director, it was brought to our knowledge that the Improvement Commissioners of Bournemouth had lodged a petition against the Bill that we were promoting in Parliament. We found that there were several very serious objections urged against the Bill, to which I will briefly refer. The petition prayed that we should not increase our capital, the Commissioners alleging that if we had judiciously spent the capital already raised, it would have been more than sufficient to meet the wants of the town; added to which the Commissioners desired to purchase the works for the benefit of the town, and hence they wished that no more capital should be expended. Then they desired that the price of gas should be regulated by the sliding scale, which is the ordinary course of things now-a-days; but they wished to have the initial or standard price fixed at 4s. 6d. per 1000 feet. They further desired that what is known as the sulphur clause should be introduced into our Bill. Now, that clause is a very serious matter indeed; it provides that no more than 20 grains of sulphur shall be allowed per 100 cubic feet of gas passed out of the works. I believe it has never been proved that the volume of sulphur in well-purified gas has done serious mischief; but to reduce the ordinary quantity down to 20 grains entails a very serious expense upon gas companies, and, as hitherto managed, a very great nuisance to the neighbourhood where the works are situated; therefore, it was most desirable that we should avoid the sulphur clause if possible. Well, we could not conceive why the Commissioners should oppose our Bill, and we thought it would be well if we could have a conference with them. We communicated with them, and I am pleased to say that they readily acceded to our request that we should meet them. The whole Board went to Bournemouth and met the Commissioners, and, after three hours discussion, we came to a compromise. The compromise was this—that the initial price of gas for the first three years should be 5s. 6d., and after that time 5s. We agreed to the extension of the Commissioners district. They have a certain district in Bournemouth, and, as the place grows, they occasionally extend the area of their powers. They not only wanted an extended district embraced at once, but they wished in the Bill to provide for all time; that in any further extension we should always deal with them as we did in the districts they formerly governed. Well, there was some objection to that, but we gave way. Then they agreed that we should raise £150,000 more capital, provided we did not spend more than £20,000 in the first two years without previously obtaining the sanction of the Commissioners. That we were quite willing to agree to. I feel morally sure that you will give us credit for acting wisely in coming to terms with the Commissioners, instead of fighting the question out in Parliament. There is no doubt in the world that it would have been a very great cost to us. Nothing could be more fair or businesslike than the way in which the Commissioners met us, and altogether the interview was of a most pleasing character. We had been given to understand that the Commissioners were men who were very difficult to deal with, and so on; but we did not find them so. We found them men of business, who wanted to benefit Bournemouth as much as possible. We explained to them that we were all in the same boat, and their reply was, "We have told your Company so for years." We were perfectly agreed on that score. Looking at the Act as it stands, we think we have obtained a very fair one, considering what modern legislation is with regard to gas companies. It is not all that we could wish. When we went before the Lords Committee there was an objection to the initial price of 5s. The Chairman of Committees said, "It is a monstrous price, and you must reduce it to 4s. 6d. at the expiration of another three years." We did not then feel that we could do that without further consideration, and we had an understanding with the Chairman that we should meet again. Ultimately, we had the time extended from three years to five, so that at the end of eight years from the date of the passing of the Act the initial price of gas at Bournemouth will be 4s. That is for all time, I suppose, or, rather, until we have to go to Parliament again—which, I hope, will be many years hence. Now, gentlemen, having told you what we have done with reference to the Bill, I will say a few words with regard to the balance-sheet, because that is now of great interest to us. There are some points in it that are not satisfactory, and I may as well admit this at once, and endeavour to tell you the reason why. Our coal account is not satisfactory, inasmuch as I do not consider that we have sold so much gas as we should from the quantity of coal used. Our coke account is not satisfactory, because I do not think we have sold so much coke per ton of coal carbonized as we should. The products account at Bournemouth is low, and I am afraid it will always be low, for this reason: Our works are so far removed from the town that the cost of carting is extremely heavy, and that is a serious drawback to us; but we are effecting such alterations in the works as will enable us to make very much more coke per ton of coal carbonized, and we shall use much less in getting the heat for our retorts, hence we shall have more coke to sell, and presently we shall show you a very much better statement of the residual products. Of course, this must take time. We began by altering the retort-settings as soon as we possibly could; we have gone on with that, and we shall probably go on during the next six months. Then there is another item that I am not happy about. The repairs and maintenance are heavy; the sum is a large one, and I am afraid that, for the next six or twelve months, we shall not be able to do a great deal for you in that respect. There are many things required to put the concern in proper working order; and as I am a great advocate for not increasing capital, but for paying for everything, as far as possible, out of revenue, these charges will have to come out of revenue for the next six or twelve months, and after that I think we shall present a very fair account to you. Now, looking at the bright side of the question, I think we have every reason to be satisfied with what we have done in a short time. You will see, if you refer to the accounts for June, 1877, that the total profit made was £3131 7s. 9d., whereas now it is £4265 8s. 5d., and that, bear in mind, after writing off £500 out of revenue for this re-construction of works suspense account. This account is one perhaps some of you may not quite understand. The money was spent for doing what properly ought to have come out of the revenue for the time being; so that the present Directors not only have to pay you, if they can, a better dividend, but they have to pay a sum of money that was rather taken in anticipation—money spent out of capital for the time being, in order that in the past you might receive the dividends you did receive. Well, that throws a little more load on our shoulders, but we are not afraid of it. I always contended that you had a splendid business, and the more I see of it the more satisfied I am that it is a splendid business, and that with anything like careful management, I have no hesitation in saying—although I never like to make rash promises—that this is probably the smallest dividend you will receive for some time. The thing looks so healthy, and the trade grows so fast, that nothing is wanted but ordinary care and management to secure you the dividends you are entitled to. Well, gentlemen, you know there are other people interested in this matter as well as we are. The people at Bournemouth are very much interested in it. I think we have satisfied them and the Commissioners that our interests are identical, and I hope we shall satisfy the consumers as well. The initial price is now 5s. 6d. We do not mean that we are bound at once to reduce the price to 5s. 6d. per 1000 feet, but if we want to pay 10 per cent., then we must reduce it to 5s. 6d. Until we pay more than 8½ per cent. we can go on charging 6s., as we do now. Every ¼ per cent. that we pay means 1d. off the price of gas. Our dividend is no longer confined to 10 per cent.—we may may have 20 per cent. if we can earn it, but for every ¼ per cent. we pay in excess of the maximum or standard dividend, we must take off 1d. per 1000 feet. So that the consumers are directly interested in the successful working of the Company. The more successfully we work for the Shareholders, the lower will be the price of gas charged to the consumers, and we shall not, when we reach 10 per cent., necessarily stop there. If we can pay 12 per cent., we shall do it, and when we pay 12 per cent. it will mean that we must have taken off 8d. per 1000 feet, and brought the gas down to 4s. 10d. At the end of three years the initial price will be altered from 5s. 6d. to 5s.; so that I think the matter is most satisfactory both to the Shareholders and to the consumers of Bournemouth. I am pleased to tell you that the supply of water and gas is at least as good now at Bournemouth as ever it was. I am not sure that it is not better than it has been on some occasions. I have been there a good deal lately, and people who are not interested in the Company tell me that they are perfectly satisfied with the way in which the Company supply them with both water and gas. I cannot close these few remarks without commending our Auditors for the very great pains they have taken in going through the old books. Those books were in a very unsatisfactory state, and I believe I am right in saying that the Auditors have lately devoted a week to them, and have balanced something like 1600 accounts. They have taken those accounts separately, and worked them up and made them balance, which is a new feature in Bournemouth accounts. Nor can I close my remarks without earnestly thanking our two friends, the Chairman and Mr. Whiteley, for the able support they have given me in endeavouring to set this matter right. I have had the most earnest support from them, and nothing could be more pleasant than the way in which they have acted. Our friend Mr. Newton has been indefatigable in getting out a number of forms and returns which may be sent up, so that we can keep the accounts here as well as they are kept at Bournemouth. Every week one return comes to me, and another to Mr. Newton. We have divided our work. I, knowing a little about engineering, look after that department; Mr. Newton specially attends to the accounts, and our two other friends here look after the general business. Hence we know who is responsible. That was one of the difficulties that we had to contend with. Before we could not find out any responsible person. No one was responsible for any misfortune that happened. Our other officers, I think I may say, are pulling with us very satisfactorily, and I hope that in the next six or twelve months we shall be able to present you with a very respectable balance-sheet. I thank you very much for listening to me, and I beg to second the adoption of the report and balance-sheet.

The motion was unanimously adopted.

The CHAIRMAN: The next motion is—"That a dividend at the rate of 7 per cent. per annum for the half year ending June 30, 1878, be paid on the original and B shares."

Mr. GODLEY seconded the motion, which was unanimously adopted.

The CHAIRMAN: Reference has been made to the Committee who were appointed, and from which such good results have accrued. They met a number of times, but the total expenditure they incurred was only £21 8s. 4d. With your permission I will move that that amount be paid, and I cannot do so without thanking those gentlemen for their services.

The motion was seconded and unanimously adopted.

Mr. GODLEY: As a member of the Committee, I may perhaps be permitted to make one or two remarks in responding for the thanks of the meeting, which the Chairman has felt himself authorized to give us. I happen to have been connected intimately with gas-works, and for 55 years I have been connected with Bournemouth. I was very much struck from the first with the prospect before the Company, if things were tolerably well managed, and I still consider that we have a splendid future before us in having to deal with a wealthy and increasing population. I believe it requires nothing but good management to ensure us good profits in time to come. I may say that I did feel a good deal of responsibility in reference to this Company, because I not only made some little venture, according to my means, in it, but I induced a good many of my friends to come into it, and it was a very serious concern to me when I found, or believed I found, that the thing was not going on so well as I thought it had been. This time twelve months ago I proposed the appointment of a Committee of Inquiry, and although I had not much to do with it, I was at Bournemouth with the rest of them, and we took a good deal of pains to investigate what was going forward. We felt that it was necessary that some alteration should be made in various respects. I am happy to say that our report was received kindly, and that many of our suggestions have been carried into effect. I entirely endorse what Mr. Mead has referred to, with regard to the improvements that have taken place, and I am happy to feel that I may congratulate the Shareholders upon the present prospects of the concern. One of the objections made to the Committee was that it would be a very expensive affair; but, as the work has been got through for £20, I think the Shareholders will agree that that objection was only a bugbear.

A vote of thanks was then accorded to the Chairman, with whose brief acknowledgment the proceedings terminated.

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REDUCTIONS IN THE PRICE OF GAS.—The following reductions per 1000 feet in the price of gas have been made:—Ashby-de-la-Zouch, 5s. to 4s. 7d., from June 30; Leominster, 4s. 7d. to 4s. 2d., from July 1; Wickham Market, 9s. 2d. to 8s. 4d., from Oct. 1 next.

## WAKEFIELD GAS COMPANY.

The Ordinary Half-Yearly Meeting of this Company was held on Monday, the 12th inst.—Mr. W. STATTER in the chair.

The SECRETARY (Mr. J. Whitaker) read the notice convening the meeting, and the following report was presented :—

The Directors have pleasure in submitting to the Shareholders the accounts for the half year ending June 30, 1878.

The amount divisible amongst the Shareholders (after applying £125 to the insurance-fund) is £4981 6s., out of which your Directors recommend the payment of a dividend for the half year ending June 30, 1878, at the rate of £10, £7 10s., and £7 per cent. per annum, respectively.

The Directors remuneration will be submitted for consideration to the meeting.

Your Directors have to report that the works and plant are in an efficient state.

Messrs. Statter, Aked, and Connor are the retiring Directors, and are recommended for re-election.

DR.—*Revenue Account, for the Half Year ended June* 30, 1878.

| | | | |
|---|---|---|---|
| To Manufacture of gas— | | | |
| Coals, including dues, carriage, unloading, and all expenses of depositing same on works | £2,673 | 2 | 5 |
| Purifying materials, oil, water, and sundries at works | 190 | 17 | 8 |
| Salaries of Engineers, including Chief Engineer, Superintendents, and Officers at works | 97 | 10 | 0 |
| Wages and gratuities at works | 760 | 8 | 6 |
| Repair and maintenance of works and plant (including renewal of retorts), machines, apparatus, tools, materials, and labour | 650 | 5 | 8 |
| Distribution of gas— | | | |
| Salaries of Surveyor, Chief Inspector, Inspectors, Assistant Inspectors, and Clerks in Light Office | 116 | 4 | 0 |
| Repair, maintenance, and renewal of mains and of service-pipes, including materials, laying and paving, and labour | 269 | 17 | 3 |
| Repairing, renewing, and refixing meters | 138 | 14 | 0 |
| Public lamps, repairing | 46 | 8 | 1 |
| Rates and taxes | 652 | 6 | 4 |
| Management— | | | |
| Directors allowances | 110 | 0 | 0 |
| Salaries of Secretary, Accountant and Clerks, Office Keepers and Messengers | 202 | 7 | 1 |
| Collectors salaries | 117 | 10 | 0 |
| Stationery and printing | 54 | 16 | 6 |
| General establishment charges and incidentals | 22 | 6 | 4 |
| Auditors | 12 | 12 | 0 |
| Law charges | 9 | 12 | 0 |
| Bad debts | 59 | 0 | 0 |
| Total expenditure | £6,183 | 17 | 10 |
| Balance carried to profit and loss account | 5,515 | 0 | 11 |
| | £11,698 | 18 | 9 |

CR.—*Revenue Account.*

| | | | |
|---|---|---|---|
| By Sale of gas— | | | |
| Common gas | £7,846 | 3 | 10 |
| Public lighting and under contracts | 759 | 2 | 11 |
| Rental of meters | 344 | 18 | 6 |
| Residual products— | | | |
| Coke, less labour and cartage | 884 | 11 | 6 |
| Tar, " " | 1,106 | 16 | 1 |
| Ammoniacal liquor | 669 | 7 | 9 |
| Rents | 46 | 15 | 0 |
| Transfer fees | 2 | 2 | 0 |
| Fittings account | 39 | 0 | 8 |
| | £11,698 | 18 | 9 |

The CHAIRMAN, in moving the adoption of the report and accounts, said he did not know that the Directors had anything very extraordinary to state to the Shareholders except that the works had been maintained in first-rate order during the past half year, and were now in very good condition. The amount of leakage had been 15 per cent., as against 16 per cent. last year, and the quantity made during the year had been 700,000 feet more than last year; so that, notwithstanding the bad times, the Company had made a little progress. The increase in the quantity of gas made last year was not so great as in the previous year, when the increase was about 5 million feet, and in the year before, even a little more than that; but still, on the whole, considering the depressed state of trade, the increase last year was satisfactory. On referring to the accounts, it would be seen that there had been £740 15s. spent on capital account during the half year, and that was principally for new mains and service-pipes. There was also £199 3s. 3d. for new machines, and £145 4s. 6d. for new meters. That brought up the capital account to £90,000, and they had £1303 13s. 7d. in hand. The Directors estimated that the land they required, together with the cost of conveying it, compensation, and various expenses, would amount to between £4000 and £5000; therefore, it would necessitate a call being made on the Shareholders during the present year. They had made £551 more profit last half year than in the previous half year, and they had saved £422 in the manufacture of gas, and £576 in the management.

Dr. WOOD seconded the motion, which was carried unanimously.

The CHAIRMAN said the next business was to order the payment of the dividend. As was stated in the report, there was sufficient to pay the usual dividend, and a balance of £1265, which the Directors recommended should be added to the reserve-fund. They had a nucleus of a reserve-fund of something like £744, and the Directors recommended the Shareholders very strongly not to increase the ordinary dividend, but to add the whole of the £1265 to the reserve-fund, which would then be brought up to something like £2000. There were many reasons why this recommendation should be carried out. Coal had got down to its minimum price, and as it would probably rise in price and not decrease, the profits would be diminished. If the Company had a diminution of profit, and wanted to dip into their reserve-fund, they would be in a position to do so if they had about £2000. The Directors thought that such a reserve-fund on their large capital of £90,000 was very little indeed. Although they could pay a larger dividend, they recommended the Shareholders not to do so, but to get the reserve-fund into something like a respectable form, so that they would have something to fall back upon if they required to do so. He moved the payment of the usual dividends on the 2nd of next month, clear of income-tax—viz., 10 per cent. on the original shares, £7 10s. on the B 5ths shares, and 7 per cent. on the new shares.

Mr. W. BRIGGS seconded the motion, and it was carried.

Considerable discussion then took place as to the remuneration of the Directors, and a resolution was eventually passed, by a majority of 19 to 7, on the motion of Mr. G. H. WESTERMAN, seconded by Alderman HOWDEN, increasing the stipend of each Director from £20 to £50 per year, and directing that an extra allowance of £100 per year, as Managing Director, should be continued to the Chairman.

Alderman HOWDEN moved the re-election of the three retiring Directors, remarking that the balance-sheet before the meeting, and the manner in which the concern had been worked, warranted every Shareholder in voting for the re-election of the three retiring Directors. The Company had very efficient Directors, and he hoped would continue to have such a Board for some time to come.

Mr. W. BRIGGS seconded the motion.

Alderman MOORHOUSE suggested that the three names should be submitted separately, and, after a little discussion, proposed a resolution to that effect.

Mr. B. WATSON seconded this resolution, which was lost, there being 12 for it and 16 against it.

Alderman MOORHOUSE then proposed, as an amendment to Alderman Howden's motion, that the three vacancies on the Board of Directors should be filled up by the re-election of Mr. Statter (the Chairman) and Mr. Aked, and the substitution of Mr. Watson in the place of Alderman Connor. He said he thought they should elect as Directors gentlemen who had a large stake in the concern, and he considered that it would be well to infuse a little fresh blood into the Board.

Mr. J. MARSLAND seconded the amendment.

On being put to the vote, it was lost by 9 for and 19 against, and the original motion was carried by 19 to 2.

The retiring Auditor was re-elected, and the remuneration of the Auditors was fixed at £25 a year each.

A vote of thanks to the Chairman closed the proceedings.

## CROYDON COMMERCIAL GAS AND COKE COMPANY.

The Half-Yearly Meeting of this Company was held on Wednesday, the 14th inst., when the following report was presented :—

The Directors, in submitting the accompanying statement of accounts to the Shareholders, have much pleasure in being able to report that the working of the Company during the half year has been very satisfactory.

The amount of gas and meter rental for the half year is £1129 12s. 8d. in excess of the corresponding period of 1877, being an increase at the rate of nearly 6 per cent.

The reports of the Gas Examiner of the Croydon Local Board of Health show that the gas has always been in excess of the standard of illuminating power prescribed by Act of Parliament, and as to purity, entirely free from sulphuretted hydrogen and ammonia.

The accounts annexed show the financial position of the Company. After carrying £741 to the insurance-fund, the balance of the profit and loss account amounts to £7653 9s. 3d. Out of this sum the Directors recommend the declaration of the usual statutory dividends at the rate of 10 and 7 per cent. per annum respectively for the half year, with an additional dividend of 15s. per cent. for the half year, all free of income-tax.

DR.—*Revenue Account for the Half Year ended June* 30, 1878.

| | | | | | | |
|---|---|---|---|---|---|---|
| To Manufacture of gas— | | | | | | |
| Coals, including all expenses | | | £9,017 | 16 | 1 | |
| Purifying materials, oil, water, and sundries at works | | | 89 | 3 | 8 | |
| Salaries of Manager and Officers | | | 167 | 6 | 0 | |
| Wages and gratuities | | | 1,443 | 7 | 0 | |
| Repairs and maintenance of works and plant (including renewal of retorts), materials, and labour | | | 1,073 | 10 | 8 | |
| | | | £11,791 | 3 | 5 | |
| Less old materials sold | | | 269 | 6 | 5 | |
| | | | | | | £11,521 17 0 |
| Distribution of gas— | | | | | | |
| Salaries of Inspectors and Clerks | | | £307 | 17 | 5 | |
| Repair, maintenance, and renewal of mains and of service-pipes, including materials, laying and paving, and labour | | | 610 | 3 | 1 | |
| Repairing and renewing meters | | | 225 | 14 | 3 | |
| | | | | | | 1,143 14 9 |
| Public lamps— | | | | | | |
| Lighting and repairing | | | | | | 345 9 6 |
| Rents, rates, and taxes— | | | | | | |
| Rents | | | £38 | 16 | 0 | |
| Rates and taxes | | | 1,198 | 1 | 3 | |
| | | | | | | 1,236 17 3 |
| Management— | | | | | | |
| Directors allowance | | | £575 | 0 | 0 | |
| Salaries of Secretary and Clerks | | | 223 | 6 | 8 | |
| Collectors commission | | | 332 | 14 | 3 | |
| Stationery and printing | | | 62 | 8 | 7 | |
| General establishment charges and incidentals | | | 315 | 10 | 8 | |
| Auditors | | | 21 | 0 | 0 | |
| | | | | | | 1,530 0 2 |
| Bad debts | | | £81 | 9 | 1 | |
| Discounts and allowances | | | 72 | 5 | 5 | |
| | | | | | | 153 14 6 |
| Superannuations | | | | | | 101 0 0 |
| Total expenditure | | | | | | £16,032 13 2 |
| Balance carried to profit and loss account | | | | | | 7,891 6 7 |
| | | | | | | £23,923 19 9 |

CR.—*Revenue Account.*

| | | | | | | |
|---|---|---|---|---|---|---|
| By Sale of gas— | | | | | | |
| Private rental—85,113,000 cubic feet, at 4s. per 1000 | | | £17,019 | 16 | 3 | |
| Public rental and under contracts | | | 2,665 | 5 | 6 | |
| Rental of meters | | | 530 | 10 | 8 | |
| | | | | | | £20,215 12 5 |
| Residual products— | | | | | | |
| Coke, less labour and cartage | | | £2,794 | 11 | 0 | |
| Breeze " " | | | 134 | 6 | 7 | |
| Tar " " | | | 629 | 17 | 3 | |
| Ammoniacal liquor " | | | 92 | 5 | 0 | |
| | | | | | | 3,650 19 10 |
| Rents | | | | | | 54 10 0 |
| Transfer fees | | | | | | 2 17 6 |
| | | | | | | £23,923 19 9 |

## NEWCASTLE-UPON-TYNE AND GATESHEAD GAS COMPANY.

The Annual Meeting of this Company was held last Wednesday—Alderman HEDLEY in the chair.

The SECRETARY (Mr. W. Hardie) read the following report :—

The Directors submit to the Proprietors the accounts of the Company for the year ending June 30, 1878.

It will be seen that the total receipts for the year are £126,793 5s. 7d.; and the expenditure £83,565 18s. 10d., leaving a balance of £43,227 6s. 9d. to the credit of profit and loss account; out of which £4878 5s. 2d. has been paid for interest on loans, and £15,309 for the intermediate dividend of 3½ per cent. in March last. From the balance remaining—viz., £23,040 1s. 7d.—the Directors recommend that £2000 be written off for the disused works at Blaydon, that £2500 be carried to credit of the renewal-fund, and that a further dividend of 3½ per cent. be paid for the half year ending the 30th of June last. This will leave £2826 1s. 7d. to be added to the balance of £7206 11s. 7d. brought from last year.

It is gratifying to observe that, notwithstanding the depression in trade, there is an increase in gas receipts of £2173 18s. 5d. Coke and tar show a decrease of £1751 8s. 11d., but sulphate of ammonia has improved £1674 15s. 4d., and on the whole the receipts are £2508 13s. 6d. better than in the preceding year. On the side of the expenditure there is a general saving, the total being £2669 2s. 10d. less than in the preceding year.

During the year 20 miles of main-pipes have been laid in extensions and renewals, 1665 new service-pipes have been laid, 1672 old service-pipes relaid, 291 new lamps erected, and 1937 meters taken out, tested, repaired when necessary, and refixed. New works, on the most improved principle, for the manufacture of sulphate of ammonia, have been erected at Redheugh, and are working satisfactorily. A new gasholder, to hold a million cubic feet of gas, is also being erected there, and will, it is expected, be completed before winter. The Directors have also deemed it prudent to lay down the foundations of a new retort-house, but the building itself will not be proceeded with this season.

In order to make provision for further erections and extensions, additional parliamentary powers will be required, and notice will be given of the Company's intention to apply for such powers in the next session of Parliament.

The Directors are glad to be able to announce a reduction in the price of gas of 3d. per 1000 feet, from the 1st of July last—namely, from 3s. to 2s. 9d. per 1000 feet, less the customary discount of 10 per cent.

The Directors, William Brown, Thomas Hedley, Benjamin Plummer, James Douglas, John Bennett Alexander, Thomas Lesslie Gregson, Ralph Atkinson, William Boutland Wilkinson, and Charles Henry Young, retire as usual, but offer themselves for re-election. The auditors, J. H. Richardson and R. Y. Green, also retire, but offer themselves for re-election.

The CHAIRMAN, in moving the adoption of the report, said it was very gratifying to the Directors to have to state that the past year had been one of the most successful that the Company had ever experienced. Notwithstanding the great depression around them, and which, he was sorry to say, many of them had felt severely, the Company had kept its place, although the increase had not been so much as in previous years. For many years, the increase in the quantity of gas sold was something like 8 per cent. per annum, and last year the increase was something like 3 per cent. The quantity of coal used last year was less than in 1877, but the quantity of gas sold was more, with better products and less leakage. The Corporation kept a very sharp look after them, and the reports sent to the Corporation had been so satisfactory, that he did not think one letter of complaint had been sent to the Company. The illuminating power was good, and the purity was satisfactory. The whole of the works had been carried on to the entire satisfaction of the Directors. There had been no strikes or unpleasantness of any kind among the workmen. They had very able managers both at Redheugh and Elswick, and also a good outdoor manager; and the whole of the work had, in every way, been carried on in an exceedingly satisfactory way to him, and more so than during the whole time he had been a Director of the Company. The receipts for the year had been £126,973, against £124,284 in 1877, £117,102 in 1876, and £115,760 in 1875. The expenditure had been £88,443, leaving a balance of £38,349; and the balances in the three previous years had been £33,128, £30,762, and £31,761, or equal to a profit per ton of coal of 8s. 8½d. this year, 7s. 6d. in 1877, 7s. 2¾d. in 1876, 7s. 9¾d. in 1875, 7s. 1¼d. in 1872, and 4s. 7½d. in 1866. The average cost of coal had been, this year, 7s. 4½d. per ton, against 8s. 0½d. in 1877, 9s. 4¾d. in 1876, and 10s. 11½d. in 1875. They received, during the past year, independent of the gas, 6s. 7½d. for other products from each ton of coal carbonized, 6s. 6¼d. in 1877, 6s. 6½d. in 1876, and 6s. 3½d. in 1875; so that the receipts from the products came within 9d. per ton of the cost of coals during this year, as against 1s. 6d. in 1877, 1s. 10½d. in 1876, and 4s. 8d. in 1875. The amount received for the gas sold last year had been £87,196; in 1877, £85,775; and 1876, £79,201; all at 3s. per 1000 feet; and in 1875, when the price was 3s. 4d., £80,908. During the year there had been 88,063 tons of coal used, against 88,252 in 1877, 85,557 in 1876. There had been made during the year 888,250,000 cubic feet of gas, or an average quantity of 2,500,000 cubic feet per day. In one week in December the quantity was 30 millions, or rather more than 4 million cubic feet per day. The produce of gas per ton of coal carbonized was, this year, 10,030 feet; and 10,062 in 1877; 10,163 in 1876; 9527 in 1872; and 8318 in 1866. The gas sold and paid for, per ton of coal used, this year had been 8652 feet; 8340 in 1877; 7957 in 1876; 7022 in 1872; and 5731 in 1866. They had this year used in the works 113 feet of gas per ton of coal, against 93 feet in 1877 and 1876. The loss by leakage had been reduced; the loss was this year 12·61 per cent. against 16·20 in 1877; 25·79 in 1876; 25·05 in 1872; and 25·87 in 1866. The works at Redheugh, which were opened at the end of 1876, had worked to the entire satisfaction of the Directors, and on two occasions the Redheugh works had supplied the whole of the gas used in Newcastle and Gateshead, and enabled changes to be made at the Elswick works. The Company had now two strings to their bow, and, during the summer months, would be able to supply both towns from either the Elswick or Redheugh works. They were in nearly as perfect a state as it was possible for them to be in, and were very much beyond anything he ever anticipated. During the past three years they had obtained upwards of 10,000 feet of gas out of every ton of coal carbonized, and he thought there was hardly any works able to do much better than that. The Company had 365 miles of pipes laid, and supplied a district extending from Hebburn to Ryton and Newburn. A considerable sum of money had been expended in the past three years in laying down larger pipes and renewing bad pipes, and the Company now received the advantage of that in reduced loss from leakage. In 1872 they sold only 7022 feet of gas out of the quantity produced from each ton of coal, or 23 per cent. less than they were now selling; and, in 1866, only 5731 feet, or 51 per cent. less than they did at present; and if, with the quantity of gas made this year, the loss had been the same as in 1872, they would have required 20,000 tons more of coal than they had used, or, compared with the loss in 1866, they would, this year, have consumed 50,000 tons more coal. The renewal of mains was all paid for out of revenue, and a considerable portion of the extensions and enlargements had also been paid for in the same way. A new gasholder, to hold one million cubic feet of gas, was being erected at Redheugh, as the Directors were obliged to anticipate the demand for gas. The gas paid for in 1877–8 was 762 million feet, being an increase of 26 per cent. on four years ago, when the quantity was 601 millions; an increase of 82 per cent. on 1870, when the quantity was 485 millions; and an increase of 98 per cent. on 1860, when the quantity was 385 millions. They might look forward to doubling the works in something like eight or ten years; and the present works were capable of making double the quantity of gas made eight years ago. They were in a good position, and would not be obliged to spend much in the next three years; but it was imperative to keep the works enlarged to meet any demands which might be made. Their capital was pretty nearly all expended, and notice would be given to the Shareholders with respect to applying to Parliament for an extension of their capital and powers. The Directors recommended that the price of gas be reduced, from the 1st of last July, from 3s. to 2s. 9d. per 1000 feet, which, after allowing the usual discount of 10 per cent., would make the price 2s. 5⅞d. per 1000 feet, which was 6d. less than it had ever before been in Newcastle; and it was expected that half of the loss on the reduced price would be saved out of the lower price the Company would pay for coals. He hoped the reduction in price would induce many people to use gas for cooking purposes. The Directors were considering whether they should supply cooking-stoves, in the same way as meters, at a small annual charge, and so enable persons, who did not feel inclined to expend the price of a cooking-stove, to try them; but this matter had not been decided yet. Another matter the Proprietors might be interested in was the electric light. He never had much fear of it, but some of the Proprietors were rather afraid it would affect them. He did not believe the electric light would affect the Company, except, perhaps, in the lighting of the streets, and he had no doubt it could be so improved as to be used for lighting the streets, which they, as a Company, need not regret. They had a monopoly in the town, and received 1s. per week per street-lamp, which, after deducting the cost of repairing of the lamps and lighting, was considerably less than the cost; so that, should the Corporations of Newcastle and Gateshead ever decide to light the streets by the electric light, it would not be a loss to the Company. He moved the adoption of the report, and that a dividend of 3½ per cent. for the half year ending the 30th of June last be declared.

Mr. THOMAS BROWN seconded the motion, which was carried unanimously.

The retiring Directors and Auditors having been re-appointed, and other business having been transacted, the meeting was brought to a close by a vote of thanks to the Chairman.

## CORK GAS CONSUMERS COMPANY.

The Ordinary Half-Yearly Meeting of this Company was held on Tuesday, the 13th inst.—Mr. T. MAHONY in the chair.

The SECRETARY (Mr. Denny Lane) read the notice convening the meeting and the following report:—

At the commencement of the present year we made a reduction in the price of gas supplied both to the Corporation and to private consumers. This change has effected a saving of nearly £2000 a year to the public, who have so highly appreciated the advantage of a lower price, that the rental is nearly restored to its former standard.

In one or two places the increase of consumption has made it necessary to enlarge the mains. This work is now in progress, and will soon be completed.

Several consumers have adopted gas apparatus for heating and cooking, and all have been highly gratified with the results. As the Company now lend heating and cooking stoves upon hire, every one, without incurring any serious outlay, can satisfy himself of the economy, cleanliness, and perfection of this system.

The works are in very good condition, and we are prepared for any increase of production which next winter's demand may make necessary.

A contract has been completed for a supply of coal sufficient for more than a year's consumption, at a moderate price, free on board, and, if freights do not advance, we will lay in our stock on favourable terms.

We have made a small addition to insurance-fund, bringing it up to £1400, and have added £500 to the depreciation-fund. After these allocations, the balance of profit and loss is £5908 10s., out of which we recommend the payment of the ordinary dividend. This will absorb £5400, and leave £508 to be added to the reserve, which will then amount to £8951.

Two of your Directors, Timothy Mahony, Esq., and Jeremiah Finn, Esq., go out of office by rotation, are eligible, and offer themselves for re-election.

One of your Auditors, George Lynch, Esq., goes out of office, and is re-eligible.

*Engineer's Report.*

To the Directors of the Cork Gas Consumers Company.

Gentlemen,—My last inspection of the works was in June last, and I expect to make another visit this month. I found the usual repairs well forward, and the works in very good condition. I trust that the inspection and renewal of defective service-pipes will be vigorously continued. I look forward to a successful half year.

*London, Aug. 6, 1878.* (Signed) GEORGE ANDERSON.

*Capital Account, June 30, 1878.*

| Dr. | | Cr. | |
|---|---|---|---|
| Share capital of the Company | £150,000 0 0 | Amount paid on shares | £135,094 0 0 |
| Debenture capital of the Company | 15,350 0 0 | Ditto debentures | 15,350 0 0 |
| | | Uncalled capital and shares not registered | 14,397 0 0 |
| | | Due by Shareholders on registered shares | 509 0 0 |
| | £165,350 0 0 | | £165,350 0 0 |

*Revenue Account.*

| | | | |
|---|---|---|---|
| Coals | £6,683 7 9 | Rental— | |
| Labour | 2,702 2 10 | March quarter | £9,828 4 9 |
| Wear and tear | 1,401 7 6 | June ,, | 4,617 4 9 |
| Purifying materials | 147 6 3 | Public lighting— | |
| Water and gas at works | 119 19 5 | March quarter | 1,104 10 6 |
| Public lighting | 379 8 2 | June ,, | 707 18 0 |
| Salaries | 909 0 0 | Residuals | 4,639 18 3 |
| Rents | 129 19 10 | Transfer fees | 4 6 6 |
| Rates | 587 1 10 | | |
| Advertising and stationery | 71 8 10 | | |
| Office expenses | 161 3 5 | | |
| House and office repairs | 6 6 10 | | |
| Auditors | 20 0 0 | | |
| Directors | 175 0 0 | | |
| Profit and loss | 7,348 10 11 | | |
| | £20,902 3 7 | | £20,902 3 7 |

The CHAIRMAN said he was glad that very few observations were required on his part. The report and accounts, he was sure, must be gratifying to the Shareholders, as from them they would see that the Company had placed themselves in the same position, as regards rental, as they were before they had made that sensible reduction in the price of gas to the public—sensible in every respect, because it was a tangible and judicious thing to do. The rental was within £200 of what it was this half of last year, notwithstanding that a reduction had been made of something like £1000 for the past six months. The general lighting had been well kept up, and the result showed that the public were afforded more light by the Corporation under the new price than they were at the previous price. The Directors had made a very favourable contract for coals; it was, in reality, in succession to the contract they had previously, and without which they would not have been in the satisfactory position they were in with regard to the rental, after the reduction in price. Should there be no advance in the price of freights, they hoped to have a favourable stock of coals laid in at such a price as would make all of them easy in their minds about dividends. As regards cooking and heating by gas, it had been tried extensively since the last meeting; and, principally owing to the energy with which Mr. Travers, their Manager, had exerted himself, it had been taken up warmly by their fellow-citizens, and in every case it had given satisfaction. He read a number of letters from gentlemen who had used the gas cooking and heating apparatus in their private houses and in their business establishments, and who testified very strongly to its great efficiency for cooking and heating purposes. In every branch of trade where tried it had proved a success, and the Directors looked upon it as a favourable result of the exertions of Mr. Travers. They were anxious that the consumption of gas in the summer should be somewhat equal to that in winter, and if they could only succeed in inducing the public to take gas for that purpose, he hoped they would be successful. The larger the consumption of gas, the smaller the price at which the Company would be enabled to sell it to the public; if the consumption increased to what the Directors expected, he saw no reason why they should not be able to supply gas at a less price than at present. In reference to the accounts, they were very satisfactory. The reserve-fund, to which they added £508 last half year, now amounted to £8951, of which £7100 was invested in railway debentures. He concluded by moving the adoption of the report and accounts.

Mr. W. DOWDEN seconded the motion, which was passed unanimously.

Mr. HALY inquired as to the progress that had been made in electric lighting. He said he saw that some companies in London were thrown into confusion by it.

The SECRETARY said that in June last he paid a visit to London, and, after having had an opportunity of inspecting the apparatus for electric lighting in operation, he did not consider there was anything in the invention to cause the slightest depreciation in gas property. This was also the opinion of the most eminent scientific men to whom he had been speaking on the subject.

The CHAIRMAN said that the Bristol Gas Company had recently commenced new works, which would cost over £500,000, and that did not look as if they were afraid of electric lighting.

Mr. MORROGH inquired what was the leakage of gas at present.

The CHAIRMAN said that was the only unpleasant thing they had to record. The leakage this year was 5 per cent. more than it was last year. In one case a 6-inch main was found to be broken, and leaking into a sewer, and 3-inch and 4-inch mains were also found to be broken. There was no other reason for believing the leakage to be excessive, except from those broken mains. They were now laying down the mains in pitch, and that would effect a great saving.

Mr. T. Rearden proposed—"That a dividend of 8 per cent. be declared for the half year ending June 30, 1878, on the paid-up capital of the Company."

Mr. B. J. Alcock seconded the motion, and it was adopted.

The retiring Directors and Auditor were re-elected.

Mr. Mahony, in returning thanks, said they were all working very smoothly now, and he thought the public at large placed more confidence in them than they used to, and they were also up before the Corporation on fewer occasions than hitherto.

A vote of thanks, on the motion of Mr. M'Ostrich, seconded by Mr. J. O'Sullivan, was passed to the Chairman, for his very valuable services on behalf of the Company.

Mr. Burke said they ought to be very glad to have such a Chairman. If the concern was his own he could not give greater attention to it. He was the right man in the right place.

The Chairman having returned thanks, the meeting separated.

## COLNE VALLEY WATER COMPANY.

The Ninth Ordinary General Meeting of this Company was held on Monday, the 12th inst., at the Charing Cross Hotel—Viscount Malden in the chair.

The Secretary (Mr. Philip Verini) read the advertisement convening the meeting, and the following report was presented:—

The Directors have to inform the Shareholders that, early in March, a special Board meeting was convened to consider the question as to the carrying out of two or three extensions which were not then done, but which, being within the parliamentary plans, the Directors, after careful consideration, decided to execute, and thus extend the operations of the Company to Pinner, besides laying two other short lines of main. These works, being now completed, enable the Company to supply water within the limits of their parliamentary district.

At the first starting of a water company, it is difficult to estimate accurately the receipts and expenses, but the last three half years offer data on which to form a fair judgment as to the prospects of the Company, and the Directors consider the steady growth of the receipts during that period very satisfactory, the receipts for water and meter rents being—

| | | | |
|---|---|---|---|
| For the six months ending June 24, 1877 | £399 | 15 | 0 |
| ,, ,, Dec. 25, 1877 | 633 | 15 | 7 |
| ,, ,, June 24, 1878 | 1019 | 9 | 10 |

The Pinner district will, no doubt, add considerably to the amount in our next report.

Dr.—*Balance-Sheet, June* 30, 1878.

| | | | |
|---|---|---|---|
| To Capital— | | | |
| 10,000 shares, at £10 per share, paid up | £100,000 | 0 | 0 |
| Debentures | 20,500 | 0 | 0 |
| Loan on debentures | 3,000 | 0 | 0 |
| Sundry creditors | 1,256 | 3 | 4 |
| | £124,756 | 3 | 4 |

Cr.—*Balance-Sheet.*

| | | | |
|---|---|---|---|
| By Expenditure, as per last account, to Dec. 31, 1877, for works construction, purchase of land, parliamentary and incidental expenses; also expenditure, as per last account, for pumping engines, plant and machinery, and cottage | £113,124 | 15 | 10 |
| Expenditure since Jan. 1, 1878, for finishing the Edgware district, and for continuation of extensions to Pinner, and sundry smaller extensions | 5,826 | 16 | 0 |
| Office furniture and fittings | 97 | 18 | 5 |
| Plumbing plant and tools | 75 | 11 | 9 |
| Stores on hand | 1,336 | 4 | 11 |
| House stores | 345 | 17 | 10 |
| Debtors— | | | |
| For water-rates | 817 | 13 | 3 |
| ,, fittings and connections | 355 | 4 | 4 |
| ,, sundries | 71 | 11 | 2 |
| Cash— | | | |
| At Bankers | 1,569 | 12 | 10 |
| Petty cash | 77 | 13 | 4 |
| Revenue account— | | | |
| Balance | 1,057 | 3 | 8 |
| | £124,756 | 3 | 4 |

Dr.—*Revenue Account, for the Half Year ending June* 30, 1878.

| | | | | | | |
|---|---|---|---|---|---|---|
| To Balance from last account | | | | £556 | 17 | 10 |
| Office expenses, rent, stationery, &c. | | | | 79 | 0 | 1 |
| Wages | | | | 211 | 17 | 0 |
| Salaries | | | | 267 | 16 | 0 |
| Commission to Collector | | | | 17 | 10 | 0 |
| Rates and taxes | | | | 8 | 19 | 9 |
| Advertising and incidental expenses | | | | 18 | 0 | 0 |
| Stable expenses | | | | 13 | 19 | 11 |
| Engine working expenses | £161 | 11 | 10 | | | |
| Less stores on hand | 43 | 4 | 0 | | | |
| | | | | 118 | 10 | 10 |
| Lime | | | | 31 | 11 | 8 |
| General working expenses | | | | 62 | 0 | 11 |
| Labour and material repairing pipes | | | | 50 | 8 | 8 |
| Meter repairs | | | | 1 | 4 | 6 |
| Interest on prepaid calls | | | | 0 | 12 | 5 |
| ,, debentures | | | | 490 | 19 | 7 |
| | | | | £1,929 | 9 | 2 |
| Balance | | | | £769 | 9 | 0 |
| Interest on loans, as per last account | | | | 31 | 12 | 7 |
| ,, calls paid in advance, as per last account | | | | 230 | 14 | 7 |
| Stamps on debenture bonds, as per last account | | | | 15 | 17 | 6 |
| ,, ,, &c., during last half year | | | | 9 | 10 | 0 |
| | | | | £1,057 | 3 | 8 |

Cr.—*Revenue Account.*

| | | | |
|---|---|---|---|
| By Water-rates | £966 | 16 | 7 |
| ,, for building supplies | 7 | 17 | 2 |
| ,, in advance | 13 | 6 | 11 |
| Special rates (filling ponds) | 2 | 13 | 3 |
| Meter-rents | 28 | 15 | 11 |
| Sale of gravel | 22 | 12 | 0 |
| ,, refuse lime | 15 | 0 | 0 |
| Transfer fees | 0 | 15 | 0 |
| Plumbing account | 82 | 7 | 9 |
| Interest on deposits | 19 | 15 | 7 |
| Balance | 769 | 9 | 0 |
| | £1,929 | 9 | 2 |

The Chairman said that when the Directors last addressed the Shareholders, a hope was held out, he believed—he was, unfortunately, not present himself—that before very long the Company would be able to supply with water the whole of the district within their parliamentary limits. This question was taken into very earnest consideration by the Directors, because they felt that to do this they would be obliged to go to very great expense; and, as the Shareholders were aware, the Board had done all they could lately to limit expenditure, but they were informed—in fact, they knew—that unless they completed their works before June of this year (that being the time limited by their Act of Parliament), they would run the risk of losing a portion, and what they considered the most valuable portion of their scheme. They therefore determined to carry on the works, and he was happy to say that now they were enabled to supply the whole of the district within their limits when called on to do so. But to do this they had had to borrow money and pay interest for it, without being able for the present to earn anything in return. When these circumstances were taken into consideration, he hoped that the Shareholders would not think the Directors had done wrong, for now, as he had already said, they were prepared to supply the whole of their district. This would also account for the balance in the revenue account, which was last time somewhat against them, being also increased, instead of diminished, as they hoped would have been the case. With respect to the Metropolitan Board of Works Water Bill, the Shareholders were aware that a scheme was set on foot by that body, and he thought it was intended to form a reservoir somewhere on Stanmore Heath. This was also considered by the Directors, but it was determined not to take any step at that time, but simply to watch the progress of the Bill, and see that it did not encroach on the Company's rights, or obtain leave to supply water in any part of their district, as prescribed by their Act of Parliament. The Bill, however, had been given up for this session, and for the present they were safe. Next session, if it was brought forward again, they would continue the same watchfulness which they had hitherto observed. Major Tulloch, the Inspector of the Local Government Board, gave notice last May that he intended holding an inquiry on the 16th of that month, relative to a proposed scheme of the Watford Board of Health to make a reservoir at Watford Heath. The Directors, in the interests of the Shareholders, put in a friendly opposition to this notice, but simply to protect the Company's own interests, and to ensure them not interfering at all with their works, or the supply of water within their district. That opposition had now been withdrawn, and so, of course, ended all chance of the Company supplying water to Watford in the future. There was considerable difference of opinion as to whether at any time it was advisable to supply Watford with water; and, personally, he thought they were much better without it. It would have been an enormous additional expense, and they would have had to make a new reservoir at Watford Heath. They would have been continually at loggerheads as to the cost of supply, and he thought they did very much better by continuing Londonwards. He regretted very much to say that, for several months past, they had lost the most valuable services of one of their Directors, Mr. Bateman, who had been suffering from severe illness. He had been of material assistance to them in many ways, and he was sure they would all hope that he would be soon restored to health and strength. Before moving the adoption of the report, if any Shareholders wished to ask some questions, he would be most happy to answer them.

Mr. Watkins said he regretted to see that the expenses were increasing more than the income, and hoped this would not be so in future. Salaries in the half year had come to £267 16s., making £331 for the year, which, he thought, was a large amount out of their returns of about £1000. Advertising and incidental expenses, £18, was a new item, and it was a large sum. All the items of expenditure, he observed, were larger, and were continually increasing, while the income increased very slowly. He should be glad to know if all their works of extension were completed, or whether another £5000 or £6000 would be required to be spent in the half year. Last half year £5800 was spent in this way, and what return was expected on this expenditure at Pinner?

Mr. Noakes observed that the expenditure at Pinner was only £4000, the £5800 including other works.

Mr. Watkins said he saw they had £817 owing to them for water-rates, and he supposed this was not collected yet.

Mr. Noakes said a portion of it was already paid in.

Mr. Watkins said he observed that the balance against the revenue account was now £1057, against £835 last half year, and, in addition to this increase of their debts, their debenture bonds were increasing very fast. He thought it was important for them to vigilantly look after the expenditure.

The Chairman, in reply, said, with regard to Mr. Watkins's questions, the first related to the salaries, which for the half year had been £267 16s. Included in this was £200 to the Secretary, his salary for the whole year. He would have to move a resolution on this subject later on. There had been a certain increase in the other salaries, as there had been more to do now that the works were finished. The advertising and incidental expenses extended over several months. Any account could be seen at any time by the Shareholders, on application at the offices in Buckingham Street.

The Secretary said that the advertising had been in the local papers for some months, to the effect that the works were completed, and that particulars could be obtained at the Edgware office, and that he attended there every week to push on the business. This advertisement would be continued till the end of September.

The Chairman said the Secretary was there every Wednesday evening to hear applications. As to the balance of the revenue against them, he had stated, this was accounted for by their having to lay the additional pipes to complete the supply, and they had to pay interest for the money, while they had not yet earned any return on it. Next year, however, they hoped to show a different state of accounts. The extensions to Edgware, Mill Hill, Highwood, Kingsbury, the Hyde, Brockley Hill, Letchmore Heath, Allum Lane, and Barnet Lane, cost them £15,000, and the revenue was £921, or £171 beyond 5 per cent. for the outlay at present, and not a quarter of the houses were supplied that they would have to supply later on, which would be done without involving any additional expense. At Pinner they laid out £4000, and the revenue was £180, or within £20 of 5 per cent. return, and at Pinner about 100 houses were supplied, whereas there were altogether 450, so if they obtained the other 350 the result would be infinitely better.

The Secretary observed that the Edgware, Mill Hill, &c., extension was bringing in between 6 and 7 per cent. already.

Mr. Watkins thought the sum paid for two clerks—£120 a year—was too much.

The Chairman said that a great deal of work had to be done. As they stated in their report, at the first starting of a water company it was very difficult indeed to estimate what the expenses or profits would be, but he thought they had shown clearly that they were doing as well as could possibly be expected, considering the short time they had been at work. It took a very long time indeed to develop a water company, as a great many of the inhabitants of the district to which water was intended to be supplied were "rather shy" of coming forward, and wished to see others trying first how the matter worked. If they had soon come forward, the Company would have begun to earn a surplus much quicker. He thought it was the duty of every Shareholder, in his own interest and in that of the Company, to do all he could personally in the district to induce his friends to take the water.

General Sir E. W. F. Walker, K.C.B. (the Vice-Chairman), said, if they referred to the receipts, they would find that those of the half year ending the 24th of June last exceeded those of the corresponding period of 1877 by three times—£399 in the June half of 1877, as compared with £1019 in the half year now under consideration.

Mr. WATKINS asked if the £1057 was the whole indebtedness of the Company.

The CHAIRMAN said that, as he had already stated, all the Company's extensions were finished, but the work was not all paid for yet. They estimated that they still owed £2000. This would appear in the next accounts.

Mr. WATKINS thought this indebtedness should have been shown in the accounts.

The CHAIRMAN said that the bills even were not in yet.

Mr. WATKINS thought the sums set down for stamps on debentures were out of proportion to each other.

The CHAIRMAN said that most of the debenture bonds referred to had been issued this half year. If they had been issued last half year, the item of £15 17s. 6d. would have been higher.

Mr. ALEXANDER SIM observed that they had £1600 ready to pay the £2000 alluded to.

The SECRETARY remarked that when they had paid everything, and raised their debentures, they would have about £1050 in hand; and, as they paid it off, they would have the £1057 at present against the revenue account to work with; so that they would have some £2000 to start with.

Mr. ROWBOTHAM, after thanking the Chairman and the meeting for the remarks made with reference to Mr. Bateman, expressed a hope that at the next half-yearly meeting that gentleman would be present, and that the undertaking would then be in as satisfactory a state as it was at the present moment. All the works were in good and sound repair; and, after the expenditure of about £2000, all the extensions, enabling the Company to supply the whole of their district, would be complete, and the inhabitants could obtain a good supply. He said that at the last meeting, he expressed a hope that the current half year would show steady progress on the past, and he was thankful to find that this had been the case. From June to December, 1877, their increase was at the rate of only £468 per annum, whereas from December to June (the past half year) the increase had been at the rate of £772 per annum, or about 175 per cent.; and if they maintained only the same rate of progress in the ensuing half year, the balance between income and expenditure would, as nearly as possible, be equal. He considered that this was a most satisfactory state of things.

The CHAIRMAN then moved the resolution for the adoption of the report and accounts.

Mr. SIM seconded the motion. He said that if the Shareholders took the accounts for Dec. 31, 1877, and allowed for the Secretary's salary, they would find that in that half year their expenses came to £879, as against £780 this half year.

The motion was carried unanimously.

The CHAIRMAN moved—"That the salary of the Secretary of the Company, for the time being, shall be fixed at £200 per annum till the amount shall be altered at some future general meeting, and that the amount be payable half yearly." In doing so he warmly eulogized the invaluable services of the Secretary, who, he said, worked hard night and day, and, indeed, employed almost all his leisure, for the benefit of the Shareholders. They had had to raise some of the salaries of the workmen, and in order that they should not appear so large, Mr. Verini, of his own accord, offered to reduce his salary by £50. They felt, however, that they could not, under the circumstances, accept this offer.

General WALKER expressed the great pleasure he felt in seconding the motion. He had before now borne his testimony to the indefatigable exertions of Mr. Verini on behalf of the Company, and he had no occasion now to reverse his opinion.

Mr. WATKINS said he was pleased to hear of the offer which the Secretary had made to reduce his salary, and he could have wished it had been accepted till some return was made to the Shareholders. He had been under the belief that the Company had the whole of Mr. Verini's services—all his time—but he had found that this was not the case. He moved an amendment that Mr. Verini accept £150 a year for his services till the Company were able to make a little return to the Shareholders.

Mr. MONRO did not at all agree with the observations which had fallen from Mr. Watkins, and could not understand how any one could have supposed that the Company had the whole of Mr. Verini's services for £200 a year. He quite agreed that Mr. Verini's services were most valuable to the Company.

Mr. SIM observed that were Mr. Verini to resign they would have to pay £500 a year instead of £200. Would Mr. Watkins accept his berth for £150 a year?

Mr. WATKINS replied in the negative, saying he was getting too old.

The amendment fell through for the want of a seconder, and subsequently the original motion was carried *nem. dis.*

The CHAIRMAN moved—"That the seal of the Company be affixed to the alphabetical Register of Shareholders;" and, in reply to Mr. Watkins, said the Articles of Association limited the number of Directors to twelve, and at present there were nine.

Mr. STIRLING, in further replying to Mr. Watkins, said 14 days notice would be required to be given in case of nomination of any Director whom the Shareholders might wish to appoint.

Mr. SIM, also in reply to Mr. Watkins, said that no cheques were signed except by the Board, counter-signed by the Secretary.

The motion was carried unanimously.

On the motion of Mr. WATKINS, seconded by Mr. Moss, a vote of thanks was passed to the Chairman and the Directors.

The CHAIRMAN, in reply, warmly thanked them for the vote. He had been compelled, through illness in his family, and not choice, to be absent from one or two half-yearly meetings. He made it a point of attending every meeting he could. With regard to the other Directors, they all did their utmost not only to check expenses, but also, if possible, to increase the Company's assets, in order to enable a dividend to be declared before long.

The meeting then separated.

## GRANTHAM WATER COMPANY.

The Half-Yearly Meeting of this Company was held on Tuesday, the 6th inst.—Mr. L. RIDGE in the chair.

The report presented was as follows:—

The Directors beg to lay before the Shareholders the accounts for the half year ending June 30, which show a sum of £3042 1s. 8d. upon the revenue account in favour of the Company.

It is proposed to apply £2700 of the above sum to the payment of a dividend at the rate of 9 per cent. per annum upon the capital of £30,000, leaving a balance of £342 1s. 8d., which the Directors think only prudent to carry forward to the next account, having in view the interest to be paid on calls next January, and the future dividend on the increased capital of the Company.

At an extraordinary general meeting of the Shareholders, held on the 4th of March last, a resolution was passed authorizing the Directors to increase the capital of the Company from £30,000 to £35,000 by the creation of 500 new shares of £10 each, the calls upon such shares to be fully paid up by the 31st of December next.

In conclusion, your Directors have the gratification of informing the Shareholders that the works of the Company continue to be in a satisfactory state.

The CHAIRMAN said he was sure it was with great pleasure that the Directors could again recommend an increase of dividend; it showed the healthiness of their undertaking, and also that they were working in the right direction, because they had now risen to 9 per cent., and, therefore, could only take one step higher to bring them to the top of the tree—10 per cent.—which they were all looking forward to. The expenditure last half year was a little in excess of the previous one, arising principally from the supplementary engine-house and cottages; but out of the old engine-house they had erected a cottage, for which rent was received. Notwithstanding the addition to the expenditure, however, they were able to show increased earnings each year. Those who had watched the steady progress of these earnings since he first became their Chairman, eight years ago, would know that they had more than doubled; and this was due to a steady increase, and not to a great jump from one year to another, showing that the demand for water had been gradually extending, thus making their undertaking more profitable. He concluded by moving the adoption of the report, and the payment of the dividend recommended therein.

The motion was unanimously carried.

Alderman BOYALL, in proposing a vote of thanks to the Chairman, remarked that it had been his pleasure to work with him now for some years, and he could conscientiously say that their interests had never suffered in his hands, but that he had always personified a due regard to everything that could affect the success of the Company.

Mr. B. C. OGDEN seconded the proposition, and said how greatly indebted they were to the Chairman for the trouble he had taken.

The CHAIRMAN, in reply, said he felt that he was undeserving of the kind words which had been used towards him. He believed they were very much like a bundle of faggots, and that as long as they held together, and he had the kind assistance of his brother Directors, their interests would really be attended to, and the very best results produced. They were considerably indebted to all concerned in the Company, and to the Engineer especially, for their endeavours to promote success; and, on behalf of himself, he thanked them very much for their kindness.

## LEICESTER WATER-WORKS COMPANY.

The Half-Yearly Meeting of this Company was held on Monday, the 19th inst.—Mr. E. S. ELLIS in the chair.

The SECRETARY (Mr. J. H. Williams) read the following report:—

| | | |
|---|---|---|
| Your Directors have to report that during the half year the gross receipts amounted to | | £12,755 15 11 |
| From which deduct working expenses | £1,990 18 11 | |
| Rates | 581 1 1 | |
| Interest | 1,242 11 9 | |
| Gratuities to officers | 915 0 0 | |
| | | 4736 10 11 |
| Leaving net profit | | £8,019 5 0 |
| Apportioned as required by the Company's Acts:— | | |
| To the Shareholders | | £6,932 12 5 |
| To the Local Board of Health | | 1,086 12 7 |
| | | £8,019 5 0 |
| From the Shareholders proportion | | £6,932 12 5 |
| Deduct income-tax | | 137 9 2 |
| | | £6,795 3 3 |
| Add balance from last half year and interest | | 500 0 7 |
| Leaving at the disposal of the Shareholders | | £7,295 3 10 |

From this amount your Directors recommend a dividend of 15s. 10d. per share for the half year (free of income-tax), leaving a balance of £11 17s. 2d.

The additional outlay on capital account during the half year has been £1996 11s. 8d., which makes the total expenditure to the 30th of June £291,071 3s. 7d., leaving a balance at the credit of capital account of £2445 18s. 1d.

The balance of revenue account enables your Directors to recommend a dividend at the rate of £6 6s. 8d. per cent. per annum (free from income-tax), after setting aside £915 to be paid as gratuities to the Officers of the Company, and the payment of £1086 12s. 7d. to the Local Board of Health as their share of profits.

The Act of Parliament under which the undertaking is transferred to the Corporation having received the Royal Assent, the functions of your Directors will cease on the 31st inst. In future the interest at the rate of 7 per cent. per annum, guaranteed to the Shareholders by the Corporation in perpetuity, will be paid on the 1st of January and the 1st of July in each year.

It is gratifying to your Directors to know that not only has the investment in the Water-Works Company been a profitable one for the Shareholders as well as for the Corporation, but that the supply of water so procured has been highly beneficial to the town. Your Directors have the further satisfaction of knowing that they will hand over the works to the Corporation in a state of complete efficiency.

The CHAIRMAN said that as this was the last occasion on which he would have the pleasure of addressing the Shareholders, he proposed to make his remarks a little more extended than usual. The Act of Parliament by which the Company's works would be taken over by the Corporation had, as they well knew, received the Royal Assent, and they were now simply on the eve of dissolution, as the works would be handed over to the Corporation on Monday, the 2nd of September next. The accounts to which they now had to ask the assent of the Shareholders showed that a dividend might be paid at the rate of £6 6s. 8d. per cent. for the half year. That dividend absorbed the whole of the balance to the credit of the revenue account, and it excluded the amount this half year, which they had set apart under the understanding come to between the representatives of the Corporation and the Company, to be paid as gratuities to the Officers of the Company. He believed, when companies were dissolved in this way, it was usual to take some such step as this; at least, it was contemplated when the arrangements were made between the Company and the Corporation; and, therefore, they had set aside out of revenue this half year £915 to be paid in the shape of gratuities to their officers. The oldest officer they had in their service was Mr. Brown, who had been with them from the undertaking of the works of the Company. Mr. Williams was their next oldest officer, and so they went on down to the last appointed, about a year ago. They proposed to distribute the £915 which they had set aside, in proportion to the length of time their officers had been in service. He hoped that to this course the Shareholders would not object. It had, he might say, the unanimous approval of the Directors and the representatives of the Corporation. Before going away from that point, he might say that their officers had served them so well that this was not merely a question of pounds, shillings, and pence; but he was anxious, on behalf of the Directors, to say that they were greatly indebted to all for their care of the interests of the Company. These matters he always felt were not questions of pecuniary payment, but of obligation for services performed. Now, it might be interesting to the meeting if he referred to a few figures. They knew that an arrangement was made at the outset that a certain guarantee should be given by the Corporation, commencing at 5 per cent. for the first three years after the opening of the works, and going on for a further period of 27 years at 4 per cent., and then terminating. Under that arrangement, for a few years the Company received payments to make up the dividend to 5 per cent. The whole amount of payment so received was £7753. After the works began to pay 4½ per cent. the Corporation were entitled to a division of the

profits in consequence of their having given the guarantee. The tota amount paid to the Corporation as surplus profits under that arrangement had been, including the payment for this half year, £25,248; so that, in a pecuniary point of view, the arrangement had been an exceeding good one as far as the Corporation were concerned. That arrangement, however, was in perpetuity, and, therefore, unless the Company had been transferred to the Corporation, the payments under it would have continued. They knew the other arrangement which had been made with the Corporation, which was that they should take over the shares of the Company by paying to every Shareholder interest at the rate of 4 per cent. upon £43 15s. for every £25 share. Now, under that arrangement, the shares at the present moment were worth about par. He had no doubt that they would continue to be worth about that sum, or rather more. The number of shares so guaranteed in perpetuity by the Corporation was 7258, and the capital represented, at £25 each share, was £181,450. Reckoning the shares now as being worth £43 15s. each, the increase in their value to the Shareholders was £136,087 10s. As the Corporation, under the arrangement originally made, held 1942 shares, the increased value of the corporation shares in the same manner would be £36,412. The rate of dividend that would be paid for last half year was £6 6s. 8d. per cent. The rate which the net earnings for the last half year would have given upon £230,000 of share capital, supposing they had set aside nothing for their officers, and there had been no division of surplus profits paid to the Corporation, and no reduction for income-tax, would have been £7 15s. per cent. per annum. The gross receipts for the year ending the 30th of June last were £25,185, and for the previous year £23,126, showing an increase in the revenue of the Company amounting to £2059. The average rate of dividend from the time the works were opened, in January, 1854, to the 30th of June last was £5 7s. 7d. per cent. per annum. Now, the works were transferred to the Corporation at the following cost. In the first place, the 7258 shares at £25 each represent £181,450. The premiums on each £18 15s. came to £136,087, and the borrowed capital to £62,684, making altogether £381,221, which had been contributed by the Shareholders. Then the Corporation payments on their shares amounted to £48,550, to which must be added payments to make up the dividends of the Shareholders, £7758, less the surplus profits received by the Corporation, £25,248, making the net contribution of the Corporation, upon which handsome dividends had been paid, £31,060, and bringing the total cost of the works up to £411,281 10s. Then the Corporation had to pay to the Shareholders on £317,537 10s., including the premiums at the rate of 4 per cent. interest, £12,701 10s. annually, and if they added to that the interest of the borrowed money, £62,684—namely, £2507—it left the annual payment to be made by the Corporation £15,208 10s. Then if they added the interest on the Corporation investment of £31,060, at 4 per cent., £1242 8s., it made a total annual cost to the Corporation of £16,450. Now, the net revenue last half year, taking out the payments which they proposed to make to their officers, was £8934 5s. They might fairly presume that the net revenue for the current half year would be £9500, making the net revenue for the year £18,434 5s., so that there would be a surplus left on this year's working to the Corporation, after paying the whole of the interest upon the shares as agreed, amounting to £1984. They must bear in mind that if the old arrangement had gone on, the payment to the Shareholders would have been rather more than that, but that would be the surplus left after paying the Shareholders their guaranteed dividend; and he had no doubt that as time passed, and the revenue of the concern continued to increase, the profits of the Corporation would be very much larger. He did not know that he had much more to add, excepting that they handed over the works to the Corporation in as perfect a condition as they could possibly be in. He did not think they could find a more perfect or complete set of works in the kingdom than the Leicester works were at present, and for this the Company were greatly indebted to their Engineer. Mr. Hawksley had advised them from the commencement of the works in 1847, and they had been designed by him, and carried out under his instructions. The success which had attended them was owing to the ability with which Mr. Hawksley and his son had advised the Directors in all their engineering operations, and he felt that it was due to his friend to say thus much. It was exceedingly satisfactory to him, after having taken the part he had done in those works as Chairman, that when it had been decided to hand them over to the Corporation, they were able to hand them over in an excellent condition. He moved that the report and balance-sheet be received and adopted.

Mr. W. H. Ellis seconded the motion, which was carried.

The Chairman moved that a dividend at the rate of £6 6s. 8d. per cent. per annum for the half year ending the 30th of June last be paid to the Shareholders, free of income-tax, on the 26th inst.

Mr. King seconded the motion, which was carried.

Mr. Hart proposed that the best thanks of the meeting be given to the Chairman, the Directors, and Auditors of the Company for their efficient services. He said that it was a great privilege that the Company had had such an able Chairman as Mr. Ellis, whose ability in conducting the affairs of the Company was well known. Many of those present might recollect the time when the Company were not so prosperous as at present, but that state of things had been improved, Mr. Ellis having watched over the concern, as it were, from its infancy to its manhood. With regard to the Directors, he had no doubt that many of them would act in their new capacity as Managers for the Corporation, and that they would bring to bear the knowledge they possessed so as to carry on the works satisfactorily. Seeing from the elaborate statement the Chairman had presented to them that they would get a considerable premium upon their shares, he did not think they could do other than thank the Chairman and the Directors for bringing the Company to the present prosperous state. The Chairman had remarked that they were undergoing the pain of dissolution, but he hoped it would be no pain to him, knowing as he did that he had done his duty to the Shareholders, and that he had been a benefactor to the town. He regretted that they had not his association as a member of the Corporation, in order that he might still continue to be the Chairman of the Water-Works Committee.

Mr. J. Bennett, in seconding the motion, said the Directors had rendered gratuitous services during a great number of years, and it must be a great pleasure to them to feel that the works which they were handing over were in so sound and efficient a state as the Chairman had told them at that meeting. If a narrow or jealous spirit had prevailed when efforts were made to depreciate the property of the Company, they might have shut up their pockets and refused to hand over the works; but they looked at the matter, not only as commercially, but sanitarily for the benefit of the town. It would be imprudent on his part to refer to the patriotic and disinterested services the Chairman had on very many occasions rendered to the town. He had great administrative ability, and was willing to place it at the disposal of the whole community.

The Chairman, in acknowledging the vote, said that he was much obliged to the Shareholders for the resolution they had so kindly passed. He had always on these occasions met with great kindness, and he might say, as the resolution included the other Directors, that they would be much obliged for the motion which had been passed. Looking back since the original formation of the works, thirty years ago, he found that there was only one Director left besides himself who was an original Director of the Company, His friend, Colonel Knight, was the only remaining Director, except himself, who was originally elected into that position. All the others had retired or removed from their midst. They had had their times of difficulty, but they had survived them, and they handed the works over to the Corporation in as complete a state as it was possible for such works to be in, and he believed he might safely say that the cost of them was moderate as compared with that of other works of a similar kind. Their charges had been moderate, and the water they had supplied was of good quality. The works, as they were at present constructed, were capable of supplying the town for some years to come, provided that care was exercised in the distribution of the water. He had said that there was only one remaining Director on the Board besides himself, but it was right that he should say that they had been served by competent officers, who had taken a great interest in the management of the undertaking. There were two of them especially he would like to name, as they had been the longest with them, one being Mr. Brown, who had been their clerk and accountant from the opening of the works. The Directors had always felt that in Mr. Brown they had an officer who could be thoroughly relied upon. His salary had only been moderate, but he had served them with great patience. The next oldest officer was Mr. Williams, the Secretary, and he should like to say that he felt personally indebted to that gentleman for the kind attention he had always given to the affairs and the interests of the Company. Years ago Mr. Williams would have resigned his appointment, had he (the Chairman) not pressed him to continue his services. He very kindly yielded to the pressure, and had remained with them to the last. To the other Officers of the Company he (the Chairman) felt indebted for their care and attention to the interests of the Company, and he was glad that the Shareholders had that day, by their vote, decided to give them some substantial recognition of the diligence they had exercised. It was to him a somewhat painful thing to have to preside at that dissolution; but he and his colleagues had the satisfaction of feeling that they handed over to the Corporation works which had cost, even including the premium, only a moderate amount. The works were constructed in the first place with great care and attention; and if the Corporation had to construct them now, with the present prices of materials and labour, they would have to pay a very much larger sum, so that they would find the total at which they stood, even with the premiums, moderate. The revenue in connection with the works would go on steadily increasing, and they would find, in a few years, that the amount paid compared favourably with the cost of any such works in the kingdom. They were in perfect condition at the present time, and he did not think it possible to improve them. He had been very grateful to his colleagues on the Board of Directors for the kind confidence placed in him during the time he had been the Chairman, and he considered it to be one of the honours of his life that he had been able to preside over their deliberations for so many years. Whilst he knew that their efforts had been a success, he could not but feel some regret at the conclusion of a work which had been to him one of so much gratification, because he felt it had conduced greatly to the interest of the town near which he was born, and in which he had lived nearly all his life. He did not believe it possible for any works to be carried on with greater unanimity and pleasure than had existed with them. During the whole 18 years he had presided over the deliberations of the Directors, he did not think they had had six divisions. His colleagues had behaved to him in the kindest manner, and they had had the utmost confidence in him. He looked with pleasure upon his recollection of a quarter of a century in connection with the Company; but he felt regret that so many of his colleagues had been taken away from them, and that so few remained to see the consummation of their labours in the handing over of their works to the Corporation. If the Corporation gave attention to the management of the works, they would be found to be of the greatest possible service to the town.

Mr. Stafford said he did not think they ought to separate before a vote of thanks was passed to Mr. Williams, the Secretary, and Mr. Haxby, the Solicitor of the Company. He agreed with all the Chairman had said in reference to Mr. Williams; and, as regarded Mr. Haxby, he was sure that he was entitled to their warmest thanks.

Mr. C. Bowmar seconded the resolution, which was carried.

Mr. Williams thanked the meeting for this mark of approval of his services. He said he was sure also that all the other officers would wish him to express their obligation to the meeting in the strongest terms possible. He was likewise sure that if they were engaged by the Corporation they would discharge their duties as conscientiously in the future as they had done in the past. He could not separate from an undertaking he had long been connected with without some feeling of regret, but those feelings were mixed with recollections of pleasant meetings in that room, when he had received the greatest kindness from the Directors.

Mr. Haxby also returned thanks, and the proceedings terminated.

## BOLTON CORPORATION GAS SUPPLY.

The Quarterly Meeting of the Bolton Town Council was held on Wednesday, the 14th inst.—the Mayor (Mr. J. Greenhalgh) in the chair.

Alderman Moscrop, in moving the confirmation of the proceedings of the Gas Committee, said that they were earnestly endeavouring to perform their duties, and, whilst resolved that the gas should be supplied at the lowest possible price, were supremely anxious and equally determined that the quality of the gas, whether as regarded its illuminating power or its chemical purity, should be such that there could be no just ground of complaint. During the year ending June, 1877, the illuminating power was only 16½ candles, and it was defective in its purity. During the year ending the 30th of June last it had averaged over 18 candles, showing an increase of 1½ candles, or about 9¼ per cent. This fact might appear trivial, but to accomplish it a better material had had to be used, a fewer number of feet of gas per ton of cannel and coal produced, and the purifying more efficiently performed. The practical effect to the consumer—the great advantage of this richer and stronger gas—was this: It had gone further; that was, a less quantity of gas had sufficed to produce the same degree of light. The price was 3s. 4d. per 1000 feet, and, by the increased illuminating power, it was equivalent to 3½d. per 1000 feet reduction. In the aggregate, the gas-rental for the year (£69,277 4s. 4d.) was decreased in value, by the 9¼ per cent. of increased illuminating power to the consumers, by the sum of £5983. On the 1st of January last the price of gas was reduced 2d. per 1000 feet. In the half year ending the 30th of June there were sold 100,751,000 feet, which, at 2d. per 1000 feet, amounted to £1506 5s. 2d., thus reducing the gas-rental by that sum. The general and depressed state of trade had had an adverse effect on the demand for gas much more than in any previous two or three years. For the first time since the years of the cotton famine, 1862-3, they had had a decrease in the make of gas—407,380,000 feet, as against 420,836,000 feet—of 13,456,000 feet; and this, he thought, might be fairly attributed to two causes—the increased illuminating power and the general and severe depression of trade in Bolton and its neighbourhood. When these combined circumstances were borne in mind, it was not unsatisfactory to find that the gross profits last year were less than the preceding one by £3278 only. As it was, the gross profits amounted to £33,421 18s. 5d., and were thus appropriated:—Annuities, £14,460 4s. 10d.; interest on loans, £4173 3s. 5d.; sinking-fund, £831 6s.;

district rate, £6457 4s. 2d.; renewal-fund, £7500. He might just observe that by a revival of trade, together with strict economy and good and skillful management, the Committee hoped still further to reduce the price of gas, to maintain its quality, and would be equally happy to transfer a larger sum to the district rate, especially as the new arrangement of the sinking-fund seemed to justify and commend that action on the part of the Committee.

Mr. HOLDEN having seconded the motion, the proceedings were confirmed.

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The following is the balance-sheet of the Gas Department from July 1, 1877, to June 30, 1878:—

DR.—*Capital Account.*

| | | |
|---|---|---|
| To Amount expended to this date— | | |
| Works and plant | £299,411 16 11 | |
| Capitalization of annuities | 155,558 12 10 | |
| | | £454,970 9 9 |
| Amount expended this year, viz.— | | |
| Retort-bed | £3 3 6 | |
| Apparatus | 1,313 3 8 | |
| Hired meters | 2,554 16 7 | |
| Sidings | 2,022 8 10 | |
| Buildings | 3,412 1 3 | |
| Mains | 6,231 17 6 | |
| | £15,537 11 4 | |
| CR.—Old metal sold | 375 11 0 | |
| | | 15,162 0 4 |
| | | £470,132 10 1 |
| To Balance brought down | | £470,132 10 1 |

CR.—*Capital Account.*

| | |
|---|---|
| By Balance carried down | £470,132 10 1 |

DR.—*Revenue Account.*

| | Year ending June 30, 1878. | Year ending June 30, 1877. |
|---|---|---|
| To Cannel and coal consumed | £28,199 18 1 .. | £28,680 18 9 |
| Wages for gas manufacture | 5,345 17 3 .. | 5,333 11 2 |
| Lime and purifying | 1,562 10 10 .. | 1,645 8 2 |
| Retorts, materials, and labour | 1,124 13 0 .. | 1,417 18 1 |
| Repairs of iron and brickwork | 2,783 4 7 .. | 3,283 17 9 |
| Water | 120 4 2 .. | 185 5 3 |
| General expenses | 383 13 5 .. | 290 16 4 |
| Salaries | 2,993 12 0 .. | 2,734 2 2 |
| Rates and taxes | 1,176 2 3 .. | 1,251 17 5 |
| Chief rent | 143 13 4 .. | 143 12 3 |
| Office expenses, stationery, and printing | 480 4 5 .. | 449 2 4 |
| Law charges | 34 17 9 .. | 65 2 10 |
| Bad debts | 198 11 3 .. | 117 7 1 |
| Meters and fittings | 5,424 0 3 .. | 6,086 1 9 |
| Chemicals | 1,572 13 6 .. | 1,567 4 3 |
| | £51,543 16 1 .. | £53,192 5 7 |
| Balance carried forward | 33,421 18 5 .. | 36,699 19 3 |
| | £84,965 14 6 .. | £89,892 4 10 |

CR.—*Revenue Account.*

| | Year ending June 30, 1878. | Year ending June 30, 1877. |
|---|---|---|
| By Gas-rental | £64,682 17 5 .. | £69,277 4 4 |
| Meter-rents | 1,068 13 0 .. | 919 11 9 |
| Meters and fittings | 6,288 9 9 .. | 7,329 7 4 |
| Coke | 3,540 17 5 .. | 3,679 19 11 |
| Tar | 3,204 2 8 .. | 3,392 6 11 |
| Spent lime | 185 5 11 .. | 150 1 6 |
| Ammoniacal salt | 5,699 6 5 .. | 4,875 19 8 |
| Rents | 116 7 10 .. | 112 17 11 |
| Sundries | 28 4 1 .. | 36 11 3 |
| Bank interest | 146 10 0 .. | 114 1 9 |
| Transfer fees | 5 0 0 .. | 4 2 6 |
| | £84,965 14 6 .. | £89,892 4 10 |

*Revenue Account (continued).*

| DR. | | CR. | |
|---|---|---|---|
| Annuities account | £14,460 4 10 | Balance brought forward | £33,421 18 5 |
| Interest on loans account | 4,173 3 5 | | |
| Sinking-fund account | 831 6 0 | | |
| Renewal-fund account | 7,500 0 0 | | |
| District-rate account | 6,457 4 2 | | |
| | £33,421 18 5 | | £33,421 18 5 |

*Renewal-Fund Account.*

| | | | |
|---|---|---|---|
| Expenditure for the year | £2,482 7 7 | Balance at this date | £7,351 13 5 |
| Balance carried down | 12,369 5 10 | Balance from revenue acct. | 7,500 0 0 |
| | £14,851 13 5 | | £14,851 13 5 |
| | | Balance brought down | £12,369 5 10 |

*Sinking-Fund Account.*

| | | | |
|---|---|---|---|
| Transfer to general sinking-fund account | £10,495 11 0 | Balance at this date | £9,664 5 0 |
| | | Balance from revenue acct. | 831 6 0 |
| | £10,495 11 0 | | £10,495 11 0 |

*Proof Balances.*

| ASSETS. | | LIABILITIES. | |
|---|---|---|---|
| Works and plant account | £470,132 10 1 | Annuities capitalized account | £361,506 2 11 |
| Amount owing to Gas Committee | 13,272 16 11 | Loans account | 125,492 0 0 |
| Stock of cannel and coal | 1,890 0 0 | Renewal-fund account | 12,369 5 10 |
| Do. coke | 130 0 0 | Deposit account | 5,534 2 0 |
| Do. ammoniacal salts | 540 0 0 | Amount owing by Gas Committee | 1,863 10 4 |
| Do. meters | 185 4 4 | District-rate account | 6,457 4 2 |
| Do. fittings | 4,782 11 4 | Extinction of mortgage-debt account | 2,512 0 0 |
| Balance at bankers | 24,801 2 7 | | |
| | £515,734 5 3 | | £515,734 5 3 |

| | Year ending June 30, 1878. | Year ending June 30, 1877. |
|---|---|---|
| Gas made | 407,380,000 cub. ft. | 420,836,000 cub. ft. |
| Gas sold and used in the works | 373,680,000 ,, | 380,637,000 ,, |
| Loss | 33,700,000 ,, or 8·27 per cent. | 40,199,000 ,, or 9·55 per cent. |
| Cannel and coal carbonized | 39,204 tons. | 38,929 tons. |
| Make of gas per ton | 10,391 cub. ft. | 10,810 cub. ft. |

DEATH OF MR. DREW.—The death is announced, on the 17th inst., at Streatham, Surrey, of Beriah Drew, Esq., in his 91st year. Mr. Drew was for many years a Director of the South Metropolitan Gas Company.

## BRITISH ASSOCIATION—MECHANICAL SCIENCE SECTION.

### THE CONSERVANCY OF RIVERS AND STREAMS.

The Inaugural Address of the President of the Mechanical Science Section of the British Association, which this year met in Dublin, was delivered, on Thursday, the 15th inst., by Mr. EDWARD EASTON, C.E.

He said: At the commencement of each annual report it is stated that one of the objects of the British Association is "to give a stronger impulse and a more systematic direction to scientific inquiry;" and its division into sections was made with the view of concentrating such inquiry upon the several departments of science. I propose to endeavour to further that object by making the Address which I have the honour to deliver, as President of Section G, a preface, as it were, to the fuller consideration of a subject of the highest interest to all the inhabitants of the United Kingdom, and not least to those who have so freely extended their hospitality to us on this occasion. That subject is the conservancy of rivers and streams, in the widest sense of the term.

It is worthy of remark that it was on the occasion of the first visit of the British Association to this city, in the year 1835, that the Mechanical Section was virtually instituted. Previous to that meeting the section of Mathematics and Physics had undertaken the discussion of questions having reference to the practical application of physical science; but at the Dublin meeting a sub section was specially appointed, which, in 1836, became Section G. The late Mr. George Rennie, that distinguished son of one of our greatest engineers, presided on the occasion. His report on hydraulics, presented to the Association in 1834, is full of research, and should be studied by every one interested in the question of rivers. I am glad to be able to announce that my Address will be followed by a series of papers on the same subject, the authors of which are certainly very well qualified to elucidate its details; and I trust that many of the other eminent men who are attending this meeting of the British Association will join in the discussion of these papers.

By the conservancy of rivers and streams, I mean the treatment and regulation of all the water that falls on these islands, from its first arrival in the shape of rain and dew, to its final disappearance in the ocean. I had at first, in my ignorance, contemplated treating the subject in a still wider manner, by referring to the rivers and streams of other countries; but I soon found that, without going beyond our own, the vast extent of the field to be traversed would make it extremely unlikely that I could, with any satisfactory result, attempt the more restricted task which I have now before me. Indeed, without the promised aid which I have referred to, I should have shrunk from attempting it at all.

The question of the conservancy of rivers and streams involves the consideration of their regulation for the following principal purposes:—1. For the supply of pure and wholesome water for the domestic and sanitary wants of the population. 2. For the supply of water of proper quality and sufficient quantity for industrial purposes. 3. For the proper development of water power. 4. For the drainage and irrigation of land. 5. For navigation and commerce. 6. For the preservation of fish.

After referring to different works that had been carried out from the very earliest times for the above purposes, the President proceeded: Legal enactments for the regulation of rivers, and for defining the rights of property in water, have existed from very early times. Solon laid down that to intercept the supply or to corrupt the quality of the water is a crime. He also enacted that, if any one dug a well to a depth of 10 fathoms (ὀργυιαι) without finding water, he should be permitted to take from his neighbour's well a pitcher of six χόες (about 18 quarts) twice a day. Plato, in his "Laws," mentions an analogous provision, but confines it to drinking water only. Another law quoted by him is more to the point. It runs as follows:—"If after heavy rains any of the lower riparian proprietors should injure a neighbour who lives above them, by stopping the downward flow of the water, or in case, on the other hand, the proprietor living higher up shall injure his neighbour below, by negligently allowing the water to run down upon him, either of them may call in the magistrates and obtain a decision for the guidance of both parties. If either party fail to abide by such decision, he shall be punished for the enviousness and peevishness of his spirit, and shall pay double damages to the injured person."

The Pandects of Justinian, which are a collection of all the old legal authorities of Roman Law, analogous to our own Reported Cases, contain a variety of leading principles which govern the administration of the law of running water—principles identical mainly with that of our own Common Law. Some of these related to fishing, watering cattle, to the interruption of navigation of lakes, canals, and ponds, to the preservation of the water supply, to the repairs of river banks, and to the regulation of the summer and winter flow of what were termed public rivers. It was enacted, among other things, that nothing should be done to the stream or banks of a public river whereby the flow should be altered from its state in the preceding summer.

The earliest record in our own Statute Law of any enactment relating to rivers is that contained in 25 Edward III., cap. 4, which legalized all "gorces, mills, wears, stanks, stakes, and skiddles" of a date previous to "the reign of his grandfather, Edward I., by which the common passage de neefs et batelx en les grantz rivers d'Engleterre be oftentimes annoyed," and ordered the immediate pulling down of all such erections which were of a later date. From that time, until the enactment of Henry VIII., there were various laws passed, chiefly relating to the navigations and rights of mills, and occasionally to the preservation of fish. After Henry VIII., very many private Acts and Charters granting powers for the drainage and reclamation of lands, for improvements of navigation, and matters of a similar kind, were passed from time to time.

A great number also of Royal Commissions and Select Committees have conducted inquiries, and made reports upon most of the various branches of the subject—*e.g.*, the pollution of rivers, the water supply, arterial drainage, navigation, fisheries, &c.; but, until the appointment last year of the Select Committee presided over by the Duke of Richmond, no attempt, as far as I am aware, has been made to grapple with the question as a whole, and the report made by them to the House of Lords omitted to deal with two, at least, of the objects I have indicated as being necessary to the proper consideration of the subject. The recommendations made in the report of that Committee were most important, and they will, if carried out, remove many of the difficulties which stand in the way of a complete system of conservancy of our rivers.

So much has been written on the engineering details of this subject, by men far better qualified than I am to deal with them, that I shall confine myself to the simple statement of the principles which have been recognized by the chief authorities as essential, and to a few suggestions which my own experience leads me to think may be of some value.

Almost all the great engineers of former generations, who have paid attention to this question—Smeaton, Telford, Rennie, Golborne, Mylne, Walker, Rendel, Stephenson, Jessop, Chapman, Beardmore—and, without mentioning names, many of the most eminent now living, have agreed to the following general propositions:—That the freer the admission of the tidal water, the better adapted is the river for all purposes, whether of navigation, drainage, or fisheries; that its sectional area and inclination should be made to suit the required carrying power of the river throughout its entire length, both for the ordinary flow of the water and for floods;

that the downward flow of the upland water should be equalized as much as possible throughout the entire year; and that all abnormal contaminations should be removed from the streams.

In carrying out these principles it is, perhaps, superfluous to say that modifications must be introduced to suit the particular phenomena of each river. In some watershed areas it would be easy to construct reservoirs, which would to a great extent equalize the flow and reduce floods. In others it might be better to control the floods by means of embankments. In others, to have weirs and sluices, delivering into side channels, parallel to the main stream, with the same object. Sometimes reservoirs, or receptacles, must be made for catching the *débris* brought down by the streams. In fact, every river must be treated as a separate entity.

It is therefore necessary that a systematic collection of data relating to rainfall, the geological character of the gathering-ground, and the volume of each separate stream should be made for each watershed area; and this should be carried on for a sufficient length of time to enable a fairly correct estimate to be formed of the behaviour of the river both in time of flood and in time of drought. The establishment of self-acting tide-registering gauges at several points of every outfall should be insisted on. By these means, the whole of the phenomena of a watershed area could be ascertained and recorded, and safe and trustworthy knowledge could be obtained, which would contribute towards the determination, not only of the works which ought to be executed, but of the incidence of the taxation by which the necessary funds should be raised.

For instance, it is obvious that where the geological character of a watershed is variable—one portion of it consisting of a permeable stratum, such as chalk or red sandstone, and another portion of an impervious stratum, such as the tertiary clays or the shales of the millstone grit—the same works would not be adapted to each section of the river, nor would it be fair to charge all with the expense according to the same scale of contribution. The former—that is, the permeable stratum—is not only, from its absorbent nature, not the cause of floods, but is, by reason of that characteristic, absolutely constituted by nature one of the very works which must be devised by art to mitigate the effects of rainfall on the latter, or impervious stratum. Bearing this in mind, I have often thought that nature might be usefully imitated in this operation by passing the surplus rainfall into the permeable strata of the earth by means of wells or shafts sunk through the impermeable strata overlying them. This has been done in isolated cases for the drainage of lands, but not for the deliberate purpose of preventing floods and equalizing the flow of rivers.

Let me say here that I am more and more convinced that the necessity for providing two kinds of water for the supply of large towns—the one for drinking and cooking, from springs and wells beyond all suspicion of contamination, the other sufficiently clean and soft for general purposes—will be gradually forced upon us as population increases. I also wish to remark that artificial compensating reservoirs may be much more frequently made use of than is generally supposed to be possible, when it is considered that, so long as the dams are constructed in situations where there is no danger of their giving way, it is by no means necessary that they should be water-tight, and that, therefore, they can be constructed at a very much smaller outlay. In fact, the purpose would be answered by a series of open weirs, which would collect the water in times of flood, and discharge it gradually down the stream. The example of our French neighbours in the more general use they make of moveable weirs—*barrages*—of various construction, could, I am satisfied, be followed by us with very great advantage in many cases.

The question of water power is one which I think deserves more consideration than it has lately received. It has been the fashion to consider that small water-mills are of little or no value, and in the present state of most rivers and streams this is to a great extent true, but only because the supply of water to work them is so variable and uncertain.

Sufficient attention has never yet been given to the subject of the amount of compensation water which should be given for the use of riparian proprietors when the watershed areas are dealt with for purposes of water supply. There is a kind of empirical rule acknowledged by most of the eminent water engineers, that one-third of the average flow of three consecutive dry years is a fair equivalent for the abstraction of the water falling on a gathering-ground. I am strongly of opinion that, looking to Imperial interests, advantage should be taken of every opportunity of dealing with a gathering-ground to provide for a much larger proportion of its available water being sent down the streams, so that the natural water power of the country may be properly developed. The extra cost of the necessary works must, as a matter of course, be borne rateably by the interests benefited.

It is certain that, with the progress of invention, many more ways of utilizing this power will be discovered. At present, through the medium of compressed air, of hydraulic pressure, and of electro-motors, the great disadvantage of its being only available at the spot where the water runs is overcome, and the power can be transmitted to any distance, and used wherever it may be most conveniently applied.

Sir Robert Kane, in his most valuable and exhaustive work on the "Industrial Resources of Ireland," has given an estimate of the value of the power allowed to escape every year in the shape of floods, and the same calculation might be applied to the sister kingdom. It is probably no exaggeration to say that where running streams exist, the power required for estate purposes, on the majority of properties in the United Kingdom, might be obtained by a proper conservation of the natural water resources of those streams.

The consideration I have been able to give to this subject has helped to convince me that, although a vast amount of labour and research has been devoted to it, it is, nevertheless, one in which "a more systematic direction to scientific inquiry" is urgently needed. A vast collection of scientific facts exists, but they require arrangement and collation, and future observations should be more strictly classified, so that the bearing of each one, both on the others and on the subject at large, may be properly appreciated with a view to a practical result. In France this is being done to a very large extent, and an excellent map, showing the phenomena of the rivers and streams of that country, is now in course of preparation. For many years, also, very accurate observations of the phenomena of the whole of the basin of the Seine have been taken, and have been centralised (*centralisées*) by that eminent Engineer whose loss all who had the privilege of knowing him, either in his work or in private intercourse, are deploring, M. Belgrand, late Inspector-General of the Ponts et Chaussées, and by his able coadjutor, M. M. G. Lemoine. These observations have been published in the form of diagrams, admirable in their simplicity of design, which show at a glance the bearing of every one of those phenomena on the general character of that river. In Italy, also, where there exists a distinct department having control of the hydraulic works of that country, the same exhaustive system of collation and record has been followed, and the results have been published in a series of tables. In Germany, although the same complete system is not in vogue, its chief river has been the subject of most thorough investigation, the results of which have been published in a beautiful map of the Rhine and its regulating works. In our own country, as might be expected from the number of engineering works which have been executed, there probably exists an amount of detailed information, on special and often minute points, which is unsurpassed and probably unequalled in the world.

But, although, as I have said before, a great number of eminent men have treated in an exhaustive manner the phenomena relating to many of the principal rivers of Great Britain and Ireland, yet, as far as I am aware, there has been no attempt to collect and combine these most valuable, though detached, fragments of knowledge, so that their relation to one another might be seen and a general conclusion arrived at. This can only be done by the establishment of a public department analogous to those described as already existing in France and Italy.

I do not wish it to be understood that, in suggesting the collection of additional data relating to the phenomena of rivers, I am advocating delay in dealing with the existing state of things until the facts have all been ascertained. On the contrary, I believe that the first step ought to be the establishment of a distinct water department, which should at once address itself to the remedying of the evils which are found to be most pressing. The time has long since arrived when the present neglected state of many of our most important streams should be dealt with, and that this was also the conviction of Parliament and of the Government is evident from the appointment of so influential a Committee as that presided by the Duke of Richmond last session.

Even the imperfect sketch which I have been able to place before you will have made manifest, I think, the enormous importance of the subject and of the interests involved—interests subject to periodical losses arising from the present imperfect organization, or, I may say, the present entire want of organization—losses which are not only monetary, and, therefore, to a certain extent capable of being estimated, but which affect health and imperil life, and, on that account, as is the unhappy experience of the highest as well as the lowest of the community, utterly incapable of appreciation.

When it is considered that many lives are annually sacrificed, either directly by the action of floods or by the indirect but no less fatal influence of imperfect drainage; when it is remembered that a heavy flood, such as that of last year, or that of the summer of 1875, entailed a monetary loss of several millions sterling in the three kingdoms—that during every year a quantity of water flows to waste, representing an available motive power worth certainly not less than some hundreds of thousands of pounds—that there is a constant annual expenditure of enormous amount for removing *débris* from navigable channels, the accumulation of which could be mainly, if not entirely, prevented—that the supply of food to our rapidly growing population, dependent, as it is at present, upon sources outside the country, would be enormously increased by an adequate protection of the fisheries—that the same supply would be further greatly increased by the extra production of the land when increased facilities for drainage are afforded—that, above all, the problem of our National Water Supply, to which public attention has of late been drawn by His Royal Highness the Prince of Wales, requires for its solution investigations of the widest possible nature—I believe it will be allowed that the question, as a whole, of the management of rivers is of sufficient importance to make it worthy of being dealt with by new laws to be framed in its exclusive behalf.

A new department should be created—one not only endowed with powers analogous to those of the Local Government Board, but charged with the duty of collecting and digesting for use all the facts and knowledge necessary for a due comprehension and satisfactory dealing with every river basin or watershed area in the United Kingdom—a department which should be presided over, if not by a Cabinet Minister, at all events by a Member of the Government who can be appealed to in Parliament. The department should have entire charge of, and control over, all estuaries and navigable channels, both because these are used by foreign vessels, and, therefore, the responsibilities attaching to their preservation are international, and because they must be protected from hostile attack, and on these accounts are essentially Imperial property. For the same reason the cost of amending and maintaining them should be defrayed out of the Imperial Exchequer.

As regards the regulation of the remainder of the watershed area, the conclusions arrived at in the report of the Duke of Richmond's Select Committee seem to me to be entirely satisfactory. I cannot do better than give a few extract from that report. The Committee say: "That, in order to secure uniformity and completeness of action, each catchment area should, as a general rule, be placed under a single body of conservators, who should be reponsible for maintaining the river, from its source to its outfall, in an efficient state. With regard, however, to tributary streams, the care of these might be entrusted to district committees, acting under the general direction of the conservators; but near the point of junction with the principal stream they should be under the direct management of the conservators of the main channel, who should be a representative body, constituted of residents and owners of property within the whole area of the watershed." The Committee go on to say that "means should be taken to ensure the appointment of a conservancy board for each watershed area;" but that application should first be made by persons interested in the district, and that then the departmental authorities should send inspectors to make local inquiries, and to report upon the "necessities and capacities of the district, and suggest the area and proportions of taxation." The scheme, with such modifications as may be deemed necessary, is then to be embodied in a Provisional Order, to be submitted to Parliament for confirmation.

It will be seen that this mode of procedure is precisely analogous to that of the Local Government Board in relation to public health—a procedure which, as I am able to state from practical knowledge, works admirably in most cases. The Committee further recommend that the provisions of any local or other Acts which would interfere with the proposed scheme should be repealed. They are also of opinion that "the conservancy boards should be able to execute the powers conferred on local authorities by the Rivers Pollution Prevention Act, 1876." It will also be necessary that their powers should extend to the carrying out of any Acts passed or to be passed for the protection of the fisheries.

With regard to what is probably the most important point of all—the finding of the money necessary to carry out these recommendations—the Committee advocate the introduction of a new principle of taxation, the soundness of which cannot be questioned. Instead of the principle first introduced by the statute of Henry VIII., and observed ever since, of levying taxes in proportion to the direct benefit conferred, the Committee propose that the rates should be distributed over the whole area of a watershed, including not only the lands, but the towns and houses and all other property situate within that area. This is, in fact, no more than a general application of the law of highways, which in the time of the Romans, according to Justinian, applied equally to waterways. It is perfectly just that every acre, the drainage of which contributes to the flow of the streams and rivers of every watershed area should, in some proportion or other, contribute also to the cost of maintaining the channels of those streams and rivers in an efficient state. The incidence of the taxation must, of course, as has been pointed out, be determined by the circumstances of each particular case; but there is no doubt that the conclusion of the Duke of Richmond's Committee, that—"the taxation should be levied on the basis of rateable value"—is the only sound, and at the same time practical, way of dealing with this difficulty. The word "taxation" is not, I fear,

generally connected with any idea of profit to the individual taxpayer; but in this case, as I hope in the course of this address I have made clear, it is probable that the prevention of large present losses, and the advantages gained by an improved system, will give not only a fair but an ample return on the capital expended.

It is my firm belief that an intelligent management of watershed areas would be compatible with an absolute profit to every interest affected; that we have here no question of give and take, but that in this, as in every other case, the laws of Nature, under proper and scientific regulation, can be made subservient to the needs of the highest civilization.

Sir JOHN HAWKSHAW moved, and Mr. DOUGLAS GALTON seconded, a vote of thanks to the President for his address.

The motion was put and carried by acclamation.

## BELFAST CORPORATION GAS-WORKS.

STATEMENT OF ACCOUNTS, FOR THE YEAR ENDING JUNE 30, 1878.

DR.—*Capital Account.*

| | | | |
|---|---|---|---|
| To Loans on mortgage— | | | |
| Amount, as per last statement | | £457,754 0 0 | |
| Less second instalment, repaid Bank of England | £11,000 0 0 | | |
| Less mortgage repaid | 200 0 0 | | |
| Less extinction of loans (repaid out of sinking-fund) | 4,225 0 0 | | |
| | | 15,425 0 0 | |
| | | £442,329 0 0 | |
| Add amount borrowed during year | | 11,700 0 0 | |
| | | £454,029 0 0 | |
| Perpetual annuities | | 2,245 14 11 | |
| | | £456,274 14 11 | |
| Balance | | 22,652 4 4 | |
| | | £478,926 19 3 | |

CR.—*Capital Account.*

| | | | |
|---|---|---|---|
| By Expenditure to June 30, 1877 | £429,920 16 2 | | |
| Meter investment to June 30, 1877 | 35,804 2 7 | | |
| | | £465,724 18 9 | |
| Additional outlay— | | | |
| New mains and service pipes | £3,010 12 11 | | |
| New scrubbers (old section) and foundations, coke, &c., for same | 4,309 6 1 | | |
| Balance of account for hydraulic machinery, balance of cost of coal tramways, additional engine, and foundations for same, and sundries | 1,105 10 2 | | |
| New condensers and connections | 1,194 10 6 | | |
| Balance of exhauster contracts, connection-pipes, &c., steam pipes and valves, hydraulic regulators, &c. | 860 15 11 | | |
| New yard clock, clock-room, and belfry | 175 9 0 | | |
| Ammonia cistern and girders for ditto | 99 16 11 | | |
| Square sett paving | 302 2 0 | | |
| Excavating, &c., foundation for new retort-benches, and castings | 202 4 3 | | |
| New lifting apparatus, purifiers (on account) | 46 14 0 | | |
| New water-main | 51 6 1 | | |
| Smith's work and material on new works | 80 0 0 | | |
| Lamp governors and taps | 164 11 1 | | |
| Sundries, including freight, &c. | 47 5 4 | | |
| | £11,650 4 3 | | |
| Less old engine sold | 31 10 0 | | |
| | | 11,618 14 3 | |
| New meters | | 1,583 6 3 | |
| | | £478,926 19 3 | |

DR.—*Revenue Account.*

| | | | |
|---|---|---|---|
| To Sale of gas* | | £74,135 15 0 | |
| Less discounts | £4,429 0 2 | | |
| Less bad debts | 248 14 0 | | |
| | | 4,677 14 2 | |
| | | £69,458 0 10 | |
| Rental of meters | £2,222 13 8 | | |
| Less discounts | £6 5 0 | | |
| Less bad debts | 13 1 2 | | |
| | 19 6 2 | | |
| | | 2,203 7 6 | |
| Public lighting and under agreements | | 9,494 9 5 | |
| Residual products— | | | |
| Sales of coke and breeze, less labour, &c. | £15,252 9 9 | | |
| Used of coke for furnaces, &c., in carbonization | 6,304 12 0 | | |
| | | 21,557 1 9 | |
| Sales of tar | | 5,535 4 0 | |
| Sales of ammoniacal liquor | | 3,375 15 0 | |
| Rents | | 108 0 0 | |
| Gas-rents recovered (formerly written off as bad) | | 4 13 2 | |
| | | £111,736 11 8 | |

CR.—*Revenue Account.*

| | | |
|---|---|---|
| By Coals, including dues, carriage, unloading, and all expenses of depositing same on works (46,470 tons) | £36,998 4 1 | |
| Purification and sundries, including labour | 1,579 3 0 | |
| Salaries of Engineer and Assistant | 850 0 0 | |
| Wages (carbonizing) | 5,764 17 5 | |
| Repairs and maintenance of works and plant (including renewal of retorts), machines, apparatus, tools, materials, and labour | 6,280 3 5 | |
| Residual products used in carbonization and for engines | 6,504 12 0 | |
| Distribution of gas— | | |
| Salaries of Chief Inspector, Inspectors, and Clerks in department | 850 0 0 | |
| Repair, maintenance, and renewal of mains and service-pipes, including materials, laying and paving, and labour | 692 9 2 | |
| Repairing, renewing, and refixing meters | 3,237 14 1 | |
| Public lamps— | | |
| Lighting and repairs | 2,361 4 11 | |
| Rents, rates, and taxes— | | |
| Rents | 135 0 0 | |
| Rates and taxes | 2,413 6 11 | |
| Salaries of Cashier, Accountant, and Clerks, Office-keepers, and Messengers | 1,528 19 2 | |
| Salaries of Collectors | 810 0 0 | |
| Stationery and printing | 145 1 11 | |
| General establishment charges and incidental expenses | 234 17 2 | |
| Audit-fund | 42 0 0 | |
| Law charges | 150 8 5 | |
| Abatement on Town Council accounts | 6 18 1 | |
| Gas-rent returned—charged in error | 16 14 0 | |
| Balance carried to net revenue account | 41,334 18 1 | |
| | £111,736 11 8 | |

* Price of gas, 3s. 9d. per 1000 feet, subject to discounts from 2½ to 20 per cent. Average price, 3s. 4d.

| | | |
|---|---|---|
| Quantity made | 482,186,000 | feet |
| Quantity sold | 440,187,000 | ,, |
| Quantity used on works (estimated) | 3,500,000 | ,, |
| Total quantity accounted for | 443,687,000 | ,, |

Quality, 16 candles, tested by Sugg's "London" Standard Burner.

DR.—*Profit and Loss (Net Revenue) Account.*

| | |
|---|---|
| To Balance from last year's account | £8,614 15 4 |
| Balance from revenue account | 41,334 18 1 |
| Bankers interest | 47 11 9 |
| | £49,997 5 2 |

CR.—*Profit and Loss (Net Revenue) Account.*

| | | |
|---|---|---|
| By Amount carried to renewal and contingency fund | | £4,000 0 0 |
| Amount applied to extinction of portion of retort-house stock (see Minutes of Council, Sept. 1, 1877) | | 2,874 0 0 |
| Interest on loans and annuities for the year ending June 30, 1878 | | 20,425 3 8 |
| Amount carried to sinking-fund | | 4,932 14 6 |
| Balance, consisting of balance from last year's account | £8,614 15 4 | |
| Less carried to renewal and contingency fund, and repairs of retort-house, as above | 6,874 0 0 | |
| | £1,740 15 4 | |
| Net profit on year's working | 20,957 6 2 | |
| | £22,698 1 6 | |
| Less carried to sinking-fund, as above | 4,932 14 6 | |
| | 17,765 7 0 | |
| | £49,997 5 2 | |

DR.—*Renewal and Contingency Fund.*

| | |
|---|---|
| To Balance from last year's account | £20,000 0 0 |
| Amount brought from profit and loss account | 4,000 0 0 |
| | £24,000 0 0 |

CR.—*Renewal and Contingency Fund.*

| | |
|---|---|
| By Balance | £24,000 0 0 |
| | £24,000 0 0 |

DR.—*Sinking-Fund.*

| | |
|---|---|
| To Balance from last year's account | £4,905 0 0 |
| One year's interest on £4905, at 4½ per cent. | 220 14 6 |
| Amount brought from profit and loss account, being one per cent. on amount borrowed and 1-100th part of capitalized annuities | 4,712 0 0 |
| | £9,837 14 6 |

CR.—*Sinking-Fund.*

| | |
|---|---|
| By Balance | £9,837 14 6 |
| | £9,837 14 6 |

DR.—*Balance-Sheet.*

| | |
|---|---|
| To Balance from revenue account | £17,765 7 0 |
| Balance from renewal and contingency fund account | 24,000 0 0 |
| Balance from sinking-fund account | 9,837 14 6 |
| Sundry amounts due for interest accruing, new machinery, &c. | 3,568 7 7 |
| | £55,171 9 1 |

CR.—*Balance-Sheet.*

| | | |
|---|---|---|
| By Balance from capital account | | £22,652 4 4 |
| Cash at bankers | | 1,677 8 0 |
| Value of stocks in hand— | | |
| Coal | £6,049 14 0 | |
| Coke and breeze | 1,750 0 0 | |
| Sundry stores | 5,540 4 2 | |
| | | 13,339 18 2 |
| Accounts due for gas | £8,767 10 11 | |
| Accounts due for meter-rent | 543 3 3 | |
| Sundry accounts for coke, tar, &c. | 2,479 10 10 | |
| Sundry accounts for service-pipes | 259 18 10 | |
| | | 12,050 3 10 |
| Sundries, including balance of Council lamp account, £3687 10s. 4d.; Harbour lamp account, £309 11s. 6d., &c. | | 4,079 17 11 |
| Half year's taxes unexpired, carried forward | | 1,371 16 10 |
| | | £55,171 9 1 |

## LIVERPOOL WATER SUPPLY.

THE RIVER SEVERN AND THE PROPOSED ABSTRACTION OF WATER FROM THE VYRNWY.

The Annual Meeting of the Severn Commission was held on Monday, the 12th inst., at Worcester—Lord HAMPTON in the chair.

The following is an extract from the report of the Committee:—

Your Committee have received an intimation from the Corporation of Liverpool of their intention to apply to Parliament, in the ensuing session, for an Act to confer on them powers for taking a supply of water for Liverpool from the River Vyrnwy, one of affluents of the River Severn.

A deputation from your Committee have attended, by request of the Corporation, at the site of the intended reservoir, at Llanwddyn, and received explanations as to the nature and extent of the intended works, and of the provisions proposed to be made for allowing a daily flow of water from the intended reservoir down the Vyrnwy, to the extent of double the minimum quantity now passing down that river in summer or autumn.

The quantity of water proposed to be taken is estimated to amount ultimately to 52 million gallons per day for the supply of Liverpool, with such additional quantity as Parliament may require the Corporation to supply to any towns on the route of their aqueduct and pipes.

The abstraction of this immense volume of water from the Severn watershed, and its diversion into another district, appears to your Engineer (as shown by his report appended hereto), and also to your Committee, to be fraught with momentous consequences to the navigation of the river and the supply of water to the Severn district.

Your Committee, therefore, deem it necessary to be prepared with the best professional testimony as to the existing circumstances of the case, by causing the same to be ascertained under the direction of your Engineer, and some other hydraulic engineer who is well skilled in such matters.

The proposed inquiry, and a determined opposition to the scheme—if such opposition should, for the protection of the navigation, be found necessary—will be very costly. Your Committee, therefore, ask your sanction to the adoption of such steps as they may find it requisite to take with reference thereto.

The report of the Engineer (Mr. Leader-Williams) contained the following:—

Your attention has been called to a project for supplying Liverpool with water from the River Vyrnwy, one of the chief tributaries of the Severn, and, as evidence given by me before the Lords Committee on flooding of rivers, is referred to by the parties to this project, in their published report, as a justification of their proceedings, it is needful that I should state the facts of the case.

[After quoting the evidence alluded to, the report proceeds:]

I. therefore, submit that the question of putting an end to the floods was treated as an impossibility, and, therefore, out of the pale of discussion. Had such a proposition been entertained, it would have been confined to the regulation of the flow of water from the upper districts of the river, whilst the idea of getting rid of the floods by the abstraction of the flood water of the Severn into other channels would never have been tolerated by any one acquainted with the tidal phenomena of its estuary.

This, however, is the proposition of the promoters of the scheme in question. Their plans embrace the formation of a reservoir at Llanwddyn, capable of containing 9000 million gallons of water collected from the watersheds of the district, and the trans-

mission of this water for the supply of Liverpool, at the rate of 13 million gallons daily, as a first instalment, whilst in the report estimates are given for a second, third, and fourth instalment of equal quantities, the whole of the four instalments making a daily requirement of 52 million gallons of water taken from the Severn.

I do not hesitate to describe this scheme as a most unwarrantable interference with the regimen of the river, and of the economy which nature has adopted for the regulation of its channel. The flood tide of the Severn runs up with a velocity five times greater than the return of the ebb, and it brings with it five times more silt than the ebb can carry away. The removal of this silt is now due to the energy and weight of the winter floods, and, consequently, every million gallons of water abstracted from the flood waters of the Severn would leave an equal proportion of silt in the river channels at its estuary.

It is, therefore, clear that the abstraction of anything like the quantity of water from the Vyrnwy, and, consequently, from the Severn, for the supply of Liverpool, proposed by the scheme in question, would be a serious injury to the navigation of the second river in the kingdom, and, therefore, the project should be vigorously opposed.

The CHAIRMAN having moved the adoption of the report, a long conversation ensued, and at length a resolution was unanimously passed, to the effect that, it appearing to the Severn Commission that the taking of a supply of water for Liverpool and district from the watershed of the River Vyrnwy, as proposed by the Corporation of Liverpool, might be fraught with serious consequences to the Severn navigation, the Committee be authorized to obtain such professional advice and assistance as they think necessary, to ascertain the probable effect upon the navigation, &c., and to report to a special meeting of the Commission.

A Committee having been appointed, the proceedings terminated.

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A Special Meeting of the Board of Severn Conservators was held on Monday, the 19th inst., at Worcester—Mr. J. W. WILLIS-BUND presided.

The following report was presented from the Chairman :—

On June 11, 1878, accompanied by Mr. Allen E. Evans, Bronhaulog, Llanyrhaiadyr, I met by appointment at Llanwddyn a deputation of the Liverpool Corporation, consisting of Mr. J. Wilson (the Chairman of the Water Supply Committee), Mr. Bower (the Chairman of the Finance Committee), the Town Clerk, and Mr. Deacon (the Engineer), and inspected that part of the Upper Verniew which the Corporation propose to convert into a lake, to be called Lake Verniew, to form a reservoir for an increased supply of water for Liverpool.

The western end of the proposed reservoir is about three miles from the north-western boundary of the Severn watershed, the entire site comprising an area of about 1000 acres. It consists of a tract of alluvial land, about five miles in length, varying from a quarter to three-quarters of a mile in width, through which flows the River Verniew. On all sides, except the south-eastern end, this land is bounded by steep hills, and here it is proposed to make an embankment about a quarter of a mile in length, 67 feet in height above the bed of the valley, and 75 feet above the bed of the stream, which will impound the flow of water, and convert this tract of land into a large lake.

About the centre of this proposed lake is situated the present village of Llanwddyn, which will be entirely submerged.

The lake, when completed, as at present designed, will, it is estimated, hold 8000 million gallons. To keep it supplied with water it is proposed to use as gathering-ground so much of the watershed of the River Verniew and its tributaries as lies above the proposed embankment. This area is estimated at 18,000 acres. In addition to this the Corporation propose to take powers in their Bill to divert, for the supply of their lake, the watersheds of two other streams that fall into the Verniew below the proposed embankment—the Marchnant on the west, with 2200 acres of gathering-ground, and the Cowny on the east, with 3000 acres.

The total gathering-grounds, therefore, that will be affected are as follows :—Verniew, 18,000 acres; Marchnant, 2200 acres; Cowny, 3000 acres; total, 23,200 acres. Or in other words, from the present water supply to the Verniew of 47,360 acres, 23,200 acres will be absorbed by the lake. This portion represents one-half of the drainage area of the Verniew above its junction with the Banw, or 1-120th part of the whole of the drainage area of the Severn district.

I may state that the Corporation of Liverpool most distinctly repudiate any connection with a scheme promoted by Mr. Williams, of Wigan, which proposes to take not only the watershed of the Verniew, but also those of the Banw and Tanat, and they authorize me most distinctly to state that they have no intention whatever of incorporating any part of that scheme in theirs.

The questions which the Board have to consider with regard to the present scheme are twofold—first, as to its effect on the spawning-grounds; secondly, the effect on the water supply.

[After referring to the effect on the spawning-grounds, the report continues :]

As to the question of the effect on the water supply, it may, in general terms, be thus stated :—The water now flowing from the 23,000 acres into the river will be confined in the reservoir, and the volume in Verniew will be diminished by this quantity.

The point of most vital importance to fisheries is the maintenance of the summer freshes; they are most valuable—first, in inducing the early spawning fish to run up to the breeding-grounds; and, secondly, in scouring out the various deposits in the river, and keeping it clean and pure. A large amount of pollution is permitted to flow into the Severn, and if the Liverpool scheme reduced the volume of its water to an appreciable extent, the evils arising from pollution would be greatly increased. The river would lose its power of carrying away the impurities collected in it, and what now perhaps is not actually poisonous would become so. The water of the Severn is not only important to fish, but (irrespective of navigation) it is also used as the water supply of several large towns on its banks, and if the volume of water in the river were to be appreciably diminished, the effect lower down would be very disastrous to various interests.

From what I can learn, the apprehensions of the effect the scheme will have on the summer freshes is exaggerated; but if the scheme materially interfered with freshes, then, in my opinion, it should be most strenuously opposed by the Board.

So far, I have treated the matter as if no water at all would come down the Verniew from the 23,000 acres of watershed appropriated for the scheme; but this will not be the case. There will be three outfalls for the water from the lake—one a surface bye-wash to take away any surplus water exceeding the 8000 million gallons that may be collected; one to take the water to Liverpool; the third, a tunnel bye-wash through which the river, during the construction of the works, will be diverted, and by which the water compensation will hereafter be given.

At my interview with the Corporation deputation, I endeavoured to ascertain the means by which it was proposed to give a constant daily supply of compensation water down the river, and maintain the summer freshes; and the deputation were of opinion that a preliminary agreement might be made with the Board upon this point and other matters to be afterwards embodied in the Bill, by which the promoters would undertake to secure such a minimum supply of compensation water (irrespective of the flow from the surface bye-wash) as would be equal to twice the present minimum summer flow, and that such supply shall be under the joint control of the Corporation and this Board.

With regard to the mills and weirs, if the Liverpool Corporation will take powers in their Act to purchase all the mills on the Verniew, and will undertake either to pull down the weirs or make, at their own cost, such fish-passes on them as the Board shall approve of, and also either to purchase or to put fish-passes in such other weirs on the Banw, Tanat, and other tributaries of the Verniew as the Board may select, I think, as regards spawning-ground, the scheme would be advantageous instead of detrimental to the Board.

If an agreement can be made with the Liverpool Corporation embodying some such terms as these, by which sufficient water can be maintained in the Verniew to ensure an ample daily supply and give moderate summer floods, and secure the removal of, or efficient means to enable the fish to surmount, the various weirs and obstructions I have mentioned, then, in my opinion, the scheme will not necessarily injuriously affect the interests of the Board.

The CHAIRMAN moved that the report be received and entered on the minutes, and copies thereof sent to the several Corporations and Local Boards and individuals affected by the scheme, asking their opinion thereon as to the course to be adopted in case the scheme was proceeded with.

Mr. OWEN seconded the motion, which was carried unanimously.

Mr. WALTON pointed out that since that report had been made, the Engineer of the Liverpool Corporation had presented a supplemental report, in which he proposed to raise the dam in the Verniew from 60 to 79 feet. That, he said, would make a very serious difference to the amount of water held back in the Verniew. He believed that the withdrawal of so large an amount of water, and the constant pouring of sewage matter into the river, would render it little better than a sewer, and the fisheries would be perfectly ruined. He advocated strenuous opposition to the scheme, and no compromise.

Mr. MORRALL moved a resolution to the effect that, pending the result of communication with the other bodies mentioned in the previous motion, and without expressing any opinion as to the future course to be pursued by the Board, the Chairman be requested to ascertain from the Liverpool Corporation the precise terms of any agreement they might be disposed to enter into with regard to the fisheries, the Chairman to report at a subsequent meeting.

Rev. W. THORN seconded the resolution, and it was carried unanimously.

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The following is the passage in the report of the Borough and Water Engineer of Liverpool (Mr. G. F. Deacon), referred to by Mr. Walton :—

At the site of the proposed puddle or concrete trench of the bank several shafts have been sunk to the rock, which has thus been proved to be of the favourable nature previously anticipated. Having determined this, the Engineer now recommends that the height of the embankment be made 79 feet above the bed of the valley. This will increase the capacity of the lake from 8000 million to about 10,000 million gallons, and will thus be of great service in promoting subsidence after rain storms, and will, moreover, ensure an extensive area of water surface in the driest seasons.

The proposed embankment, 79 feet high, will contain 570,000 cubic yards, and will impound 10,500 million gallons. The Turners bank at Rivington is 99 feet high, contains 645,000 cubic yards, and is one of the banks of the Yarrow reservoir, which impounds 839,030,000 gallons. The Yarrow bank is 86 feet high, and closes the other end of the above reservoir. The Rake Brook bank at Rivington is 83 feet high, and impounds 80 million gallons.

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## THE LANCASHIRE COAL AND IRON TRADES.

(FROM OUR OWN CORRESPONDENT.)

The only material change to notice in the coal trade of this district since last week is a slightly improved inquiry for the better classes of round coal suitable for house-fire purposes, and some of the pits are able to work a day or so more a week than they have been doing. There is, however, nothing like any push for this class of fuel, and the increased inquiries are more for shipment than for local consumption, as the close of the season when cargoes can be sent to some of the ports is now approaching. It is, however, expected that home buyers will soon be making preparations for securing their winter stocks, but no material alteration in prices is anticipated, as there are not only heavy stocks at many of the collieries, but the general production could be easily increased to meet any additional demand that is probable. There is nothing new to report with regard to gas-making coals, and common coal for steam and forge purposes continues a drug. Engine classes of fuel are moderately steady at about late rates; slack being still scarce, in consequence of the stagnation in the round coal trade. Prices generally continue very irregular, because of the great underselling still going on the market, but the average quotations may be given about as under :—8s. 6d. to 9s. for good Wigan Arley, 7s. to 8s. for common, 6s. 9d. to 7s. 6d. for Pemberton four-feet, 6s. for common Wigan mines, 5s. to 5s. 6d. for forge coal, 4s. to 5s. for burgy, and 3s. 6d. to 4s. for slack, at the pit mouth.

In the iron trade the demand for immediate requirements continues very small, and although there are still inquiries for forward contracts, there seems to have been rather a falling off in these during the past week. Lancashire makers of pig iron are, however, still firm at their full list rates, as they have sufficient orders on hand to take away their present small production; but outside brands can be bought at very low figures. There is no material change in the finished iron trade. Some of the large forges are reported to be busier, but the general complaint is still that works are very slack, and Lancashire bars delivered into the Manchester district can be bought at about £6 per ton.

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## THE COAL AND GENERAL TRADE OF THE NORTH OF ENGLAND.

(FROM OUR OWN CORRESPONDENT.)

The gas coal trade last week was, off and on, about the same as the previous week—that is, all the leading collieries in the trade had their full complement of orders, and several of them had somewhat longish turns. In some instances they were as many as eight days.

The shipments of gas coals from the Tyne Dock were fully an average last week; in fact, a little over. No doubt, as the nights are rapidly lengthening, the improvement in the gas trade will continue. There is an increase in the inquiry for second-class gas coals. It is not very great, however. Turns are much shorter than at the best collieries. Quotations are unchanged. The business done in steam coals is not so good. The price of steam coals ranges from 7s. 6d. to 9s. 3d. per ton. A good medium quality may be had at 8s. per ton. House coals are in moderate request, and prices are low. Except at the higher class of collieries, great difficulty is experienced in keeping the working days up to ten a fortnight.

Coasting freights are no better. Quotations are—London, steamers 4s., small boats 4s. 3d., sailing ships 4s. 10½d. to 5s.; Hamburg, steamers £5 per keel; Havre, 5s. per ton; Cork (gas), 5s.; Dublin (gas), 5s. 9d. to 6s. 3d. per ton. Bordeaux, £6 5s. per keel. Copenhagen has dropped to the remarkably low figure of 5s. per ton. For the Baltic, the rate to Cronstadt is £7 per keel. Freights to the lower ports of the Mediterranean were from 10s. to 15s. per keel better last week.

With regard to general manufactures, the chemical market was exceedingly quiet last week, and a very limited business was done. The iron market was a little stronger. A good deal of business is being done in the manufacture of ships plates, as iron shipbuilding is pretty active on the Tyne and Wear. Pig lead is selling on the Tyne at £16 10s. per ton; dry white lead, £23; red lead, £18; flake litharge, £19 per ton. Copper, flat, cake, and ingot, £66 to £68; best selected, £72 per ton. A little better trade is being transacted in fire-clay goods for furnace and gas purposes for the Continent and the coast. Generally speaking, however, the shipments of goods to the Continent are low, especially for the season of the year.

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## TRADE NOTES FROM SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

The usual monthly meeting of the Forfar Gas Commission was held on the 19th inst., when Provost Lawson, who occupied the chair, submitted the estimates for the ensuing year. Assuming that the recommendation of the Committee of Management as to reducing the price of gas from 5s. 10d. to 5s. 5d. per 1000 feet would be agreed to, the estimated income would be —for gas, 17,500,000 cubic feet, at 5s. 5d., after deducting discounts, £4503, or, together with the meter-rents and the sales of coke and other residual products, a total of £4928; and the expenditure was estimated at £4779, showing a surplus of £149. The various recommendations were agreed to, one of which was that a gratuity of £10 should be made to Mr. D. B. Esplin, the Manager, in recognition of his diligent attention to the interests of the Corporation. Amongst the people outside of the Town Council, it is complained that the reduction in price is made at the cost of efficiency, if not even of safety, and that the Commissioners are not adhering to the provisions of the local Gas Act, more especially as regards the sinking and contingent funds.

A special meeting of the Shareholders of the Elgin Gas Company was held the same day to consider the recent resolution of the Town Council to take over the gas-works by arbitration, which resolution was come to

after the Directors had refused an offer of £17 10s. per share for the works. Mr. Cameron, the Chairman, moved that they now proceed to hand over the works by arbitration. Mr. Smith, in seconding the motion, said he was clearly of opinion that the offer of £17 10s. per share should be refused. Another speaker, who also thought the Town Council's offer should be refused, remarked that arbitration would result in giving the Shareholders a fair price for their property, while the Town Council would have the satisfaction of knowing that they did not pay more for the works than they were really worth. The motion was unanimously agreed to.

The improvement in the lighting of the streets of Aberdeen is being pushed forward as rapidly as possible, and now the flat-flame burners vastly outnumber the old "cockspur" jets. During the past summer 272 additional lamps have been fitted with the larger shades which are now being adopted, and (exclusive of the harbour lamps, which are paid for by the Harbour Board) there are now in the city no fewer than 2150 public lamps, of which 1529 are lit by flat-flame burners, and 612 by cockspur jets.

At the last meeting of the Edinburgh Town Council, held on Tuesday, the 13th inst., a memorandum as to instantaneous lighting and extinguishing of the public lamps was remitted for consideration to the Cleaning and Lighting Committee.

In submitting the estimates of revenue and expenditure of the Police Department of the Glasgow Town Council on Monday, the 12th inst., the Treasurer stated that last year's expenditure in the lighting department and lighting of common stairs was less than the estimate by £4076 3s. 3d. That, however, was not due to any actual saving, but chiefly to the fact that the increased consumption of gas consequent on the supply of improved burners, which it was decided in the beginning of last year to introduce, was allowed for in the estimates. Referring to the same subject, Mr. Moir said it was an exceedingly painful thing that the cost of lighting private stairs had now amounted to the enormous sum of £10,000 a year. He believed there was nothing else like it in the kingdom—no instance of a town or village where the landlords were privileged to dip their hands into the public pocket in order to make their properties more habitable than they would be otherwise. Bailie Osborne also strongly protested against the continuance of the system of making the ratepayers bear the cost of lighting the common stairs within the city.

At the monthly meeting of the Paisley Corporation Gas Trustees, held last Tuesday, the question of disposing of a portion of last year's gas profits was up for consideration. One of the members, who was quite surprised at the prosperity of the Gas Trust, moved that £500 of the surplus revenue be applied to burgh improvements; and Treasurer Russell proposed that the sum be £1000. The Provost showed, however, that they would be called on, at an early date, to expend something like £11,000; and that, as their borrowing powers under the Act were almost expired, they would have again to go to Parliament, unless they could persuade the Government to grant them a Provisional Order, to extend their borrowing powers. After some discussion, the motion was withdrawn, and the question of obtaining a Provisional Order was remitted to the Standing Committee. Notice was given by the Provost of a motion to make a considerable increase to the salary of Mr. Hislop, the Manager of the works, and a gratuity in recognition of the extra labour performed by that gentleman in connection with the extension of the works.

The Forfar Water Act was laid on the table at a meeting of the Forfar Police Commissioners, held yesterday week, and a remit was made to the Water Committee to forthwith carry out the works provided for in the Act. Several of Mr. Bateman's servants have lately been engaged in marking off the reservoir. Including the water supply works, a scheme for the disposal of the sewage of the town, and a new shambles, there is an outlay of something like £50,000 in immediate prospect for the burgh.

Public intimation has been made by the Paisley Water Commissioners of the very limited supply of water that is contained in the reservoirs, and the most rigid economy has been requested. In the Rowlank reservoir, which has been apportioned exclusively to the Elderslie and Johnstone districts, there was only a supply equal to seven days consumption last Friday, and on the same day the reservoirs which supply the town of Paisley had only enough water for a consumption extending to about five or six weeks. If wilful waste is discovered by the authorities, they are determined to punish the misdemeanants under their parliamentary powers, which enable them to enforce a penalty of £5 in each case. It is feared some of the public works may stop for want of water.

Notwithstanding the long-continued drought of the past summer, the water supply of Greenock is in an excellent condition. At a meeting of the Water Trust, held last Tuesday, it was reported that in the various reservoirs the amount of water in store was 335,978,935 cubic feet, or 96 days supply for all purposes. At the same meeting it was resolved to reduce the domestic water-rate from 9d. to 8d. per £1 of rental.

There is a probability that the Local Authority of Inverkeithing, acting under pressure from the Board of Supervision, will soon come to terms to obtain a supply of water from the Dunfermline Water Commissioners, at a cost of about £4750.

The Board of Supervision are also stirring up the Local Authority of Newport to take action towards getting a public water supply. It may be remembered that there has long been a talk of getting a supply from the Dundee Water Commissioners, the pipes to be carried along the Tay Bridge. Hitherto, however, the talk has not had any very definitive result.

On Wednesday last, the Dundee Water Commissioners paid an official visit to Lintrathen, to inspect the works under their charge, on which occasion Provost Robertson delivered a very interesting speech on the history of the Dundee Water Supply. It was at one time intended to have a formal opening of the new works, but many circumstances conspired to prevent the carrying out of that intention, and the visitation of last Wednesday was held to be in place of the formal inauguration. When the water supply of the town came into the hands of the Commissioners, in 1869-70, the domestic water rate was 1s. 6d. per £1, and the yield was £19,365 9s. 5d., and in 1877-78, with a domestic rate of 1s. 1d. per £1, the revenue rose to £31,768 4s. 5d.

The Aberdeen Water Commissioners also had their annual visitation of the works on Wednesday, and it may be stated, in connection with that matter, that the amount of water abstracted from the Dee, under the Act of 1862, now amounts to 5,000,000 gallons per day, and that the water revenue has been raised from about £7000 to upwards of £12,000, while the water-rate has been reduced from 1s. 3d. to 10d. per £1 of rental.

Glasgow Corporation Water Annuities were raised 10s., at 102½, last Wednesday, but no business was done. On the following day they were firm at that quotation.

Business continues to be very dull in the Glasgow pig iron market, and the very low prices now ruling do not appear to attract buyers; indeed, the very critical position of the Scotch iron trade, on account of the continued absence of demand, begins seriously to alarm holders. As low as 48s. 4½d., prompt cash, was accepted on Friday afternoon, but at the close buyers were offering 48s. 6d. cash, and 48s. 9d. one month, sellers near.

Nothing fresh falls to be reported regarding the coal trade. There are very large outputs of house coal coming forward, but sales are difficult to make. Some good forward orders for gas coal have lately been closed.

LEOMINSTER GAS COMPANY.—At a meeting of the Directors of this Company, held on the 16th inst., it was agreed to pay interim dividends of 10 and 7 per cent. per annum on the two classes of shares for the half year ending the 30th of June last, and, at the same time, to reduce the price of gas from 4s. 7d. to 4s. 2d. per 1000 feet from the 1st of July.

OSSETT GAS COMPANY.—The half-yearly meeting of this Company was held on Thursday, the 8th inst.—Mr. W. Statter in the chair. The usual dividends of 10 per cent. on the original, and 7 per cent. on the B shares were declared, and a cordial vote of thanks was passed to the Directors for their management of the Company.

EAST ARDSLEY GAS COMPANY.—The half-yearly meeting was held on Thursday, the 8th inst.—Mr. W. Challenger in the chair. The Secretary (Mr. W. Banks) presented the statement of accounts, which showed that the gas-rental for the half year had amounted to £327 6s. 4d., and meter-rents to £8 19s. 2d. There had been received for coke £19 0s. 6d., and for tar, lime, and ammonia £32 14s. 9d. Other receipts brought up the income for the half year to £401 8s. 3d., and after payment of all expenses the balance of profit was £35 9s. The reserve-fund stood at £346 8s. 11d., as against £334 19s. 11d. last half year. The Chairman, in moving the adoption of the balance-sheet, and the payment of a dividend of 2½ per cent. on the year, said that if the profits of the concern for the last half year had been as large as in the previous half year, the Directors would have been in a position to recommend a dividend of 5 per cent. instead of 2½ per cent. He accounted for the profits not being so large from the fact that the Ardsley Mills were still unoccupied. The motion was carried, and a vote of thanks to the Chairman and Directors was passed.

INTERNATIONAL CONGRESS ON WATER SUPPLY.—At the French Hygeian Congress, lately held at Paris, and which has more than 1000 members, more than half of whom belong to foreign countries, the question of the supply of drinking water to towns, and its influence on health, was fully discussed. Mr. J. G. Jäger, Director of the Amsterdam Water-Works, who presided at the 6th section of this Congress, read a most interesting paper on the matter, and further stated that, as far back as 1870, he had called attention to this most important subject, and, at the request of the French Government, his views had been published. His proposal, that it was the duty of the State to have the supply of pure wholesome drinking water submitted to proper inspection and control, was unanimously adopted. An influential International Union was also formed to press this subject on the respective Governments, with the object of convincing them that a proper supply of pure water was a duty imposed upon the State. Mr. Edwin Chadwick, C.B., of London, accepted the honorary presidency of a committee consisting of the following gentlemen:—Professor Gübler and M. Laccasagne for France, Dr. Chaumont for England, Mr. Jäger for Holland, and Dr. Janssens for Belgium. Delegates from England, France, Holland, Belgium, Germany, Russia, Sweden, Norway, Spain, Portugal, Italy, and even Australia, were the founders of this Union.

TAPPING THE LOWER GREENSAND.—The lower greensand has just been penetrated at Her Majesty's Dockyard at Chatham, by a boring conducted by Messrs. Docwra and Son. The stratum was reached at a depth of 903 feet from the surface, and the water has risen so high as to overflow the top of the well. A year ago the boring had been carried down to a considerable depth in the chalk, when the character of the water was unsatisfactory, being brackish. The authorities at the Admiralty then consulted Professor Ramsay, the Director-General of the Geological Survey, as to the probability of reaching the lower greensand if an attempt were made to penetrate the gault. The opinion given was decidedly in favour of the effort, the dip of the lower greensand in the Maidstone area being in the direction of Chatham. Professor Ramsay was also of opinion that the quantity of water to be thus obtained would be considerable. In accordance with this advice the boring was continued, and the anticipations expressed appear to have been fully verified, helping to throw further light on the geological aspect of the water supply in the south-east of England and the vicinity of the Metropolis. Some years ago Messrs. Docwra and Son tapped the lower greensand at Caterham, but as the boring was very small it became choked with sand. The lower greensand has also been found, somewhat recently, at Loughton, in the district of Epping Forest, about four miles south-east of Waltham, an ample supply of water being obtained from this stratum, at a depth of 1092 feet.

KIDSGROVE GAS COMPANY.—The annual meeting of this Company was held on Thursday, the 15th inst.—Mr. J. Gater in the chair. The Secretary (Mr. T. Wardle) read the report of the Directors, which showed that, during the year, 1076 new shares had been issued, upon which two calls of £1 per share had been paid, and it was decided to make another call in October next. During the past year the new gasholder and tank had been put in good working order, the work having been done from plans prepared by Mr. Davies, the Manager. So far as the sale of gas was concerned, there had been a falling off in some parts of the old district, through the depression of trade, but in the new districts there had been an increase of 5 per cent. During the depression in trade the Directors had to exercise special economy in order to keep the plant in good working order, to keep up good trade, and thus secure fair profits. The retiring Directors were Mr. G. W. Garlick and Mr. S. Knapper, and Mr. Brindley as one of the Auditors, all of whom were eligible for re-election. The Chairman, in moving the adoption of the report, observed that the Shareholders were doubtless aware that there were now two schemes talked about which tried to do away with gas companies, but he thought that hitherto very little had been done to militate against them. There was the electric light, and the making of gas from the sewage of towns, neither of which had, as yet, been successful in any way. In reference to the former, he had been told by a large millowner, who had introduced it into his works, that he could do no good with it, for the shadows reflected so greatly that, in many cases, the hands could not see to work, and, so far as he had tried it, it had been a failure. It might do in some cases, such as in public squares, but not in large rooms. So far as the other scheme was concerned, it had been laughed at, and nothing had come of it. He thought the Company had nothing to fear from any of the new schemes; but if anything really did occur so as to give a better light at a less cost, they as a Company would be prepared to embrace it. He moved that the report be adopted, and that a dividend of 10 per cent. on the old, and 7 per cent. on the new shares be paid. This was agreed to, and the retiring Directors having been re-elected, the meeting closed with a vote of thanks to the Chairman.

NORMANTON GAS COMPANY.—The half-yearly meeting of this Company was held on Saturday, the 17th inst. Mr. W. Statter presided, and, in moving the adoption of the report, said that the receipts for gas last half year were £1255, as against £1294 the previous half year, and the decrease was so small that, considering the great depression in trade, he thought they might congratulate themselves that it was no more. The coke account was £80 16s., as against £121 16s. 9d.; tar, &c., £185 14s., as against £196 last half year; the total receipts for the half year being £1576 13s. 2d., or about £72 less than the previous half year. They had expended for coal £387, as against £437, the amount paid for wages being the same, and though the income of the Company had been a little less, they

had reduced their expenses, so that while the profit the previous half year was only £713, last half year it was £815, and the reserve-fund was £913 4s. 9d. These two amounts it was proposed to dispose of by declaring a dividend for the half year of 7½ per cent., which would absorb £712 10s., and then there would be a balance of £1016 3s. 11d. It would have been possible to declare a larger dividend, but the Directors did not think it advisable to do so. He might mention that under their new Act the Company were now known as the Normanton Gas Company, not as the Normanton Gas and Water Company, which was the original title. Mr. Walker seconded the motion, which was carried. The resolution for the payment of the dividend on the 2nd of September next was also carried, on the motion of the Chairman, seconded by Mr. G. H. Westerman. Under the new Act, the Directors of the Company all retired on the day of meeting, and it became necessary to elect new ones or re-elect the former Board. The question of remuneration arose, and, on the motion of Mr. Cumberbirch, seconded by Mr. Sidebottom, it was resolved to advance the payment of the Directors from £6 to £10 a year each, the Managing Director to have £10 extra. This having been done, the old Directors were unanimously re-appointed to their office. The Chairman said he was much obliged for the confidence shown in the Directors by their re-election, and he hoped they would all live to see the Company more prosperous in the future than in the past. The chief opponents to obtaining their Act had been the Normanton Local Board, and this opposition had caused the Company very considerable expense, and it must have cost the Local Board at least £1000, and they had not had as much conceded as they would have had if they had come to the Directors in a friendly manner, and talked the matter over with them.

## Register of New Patents.

### APPLICATIONS FOR LETTERS PATENT.

3153.—Sugg, W. T., Westminster, "Improvements in gas-regulators." Aug. 9, 1878.
3168.—Kinch, T., Heaton Norris, Lancs, "A new or improved valve for making connections to water and gas mains under pressure, and method of operating the same." Aug. 10, 1878.
3202.—Kirkham, T. N., Westminster, and Chandler, S., jun., Newington Causeway, "Improvements in valves." Aug. 13, 1878.
3225.—Boynton, L. W., Hartford, U.S.A., "An improved liquid-meter." Aug. 15, 1878.
3257.—Hills, F. C., Deptford, Kent, "Improvements in the manufacture of sulphate of ammonia and apparatus to be used in the said manufacture." Aug. 17, 1878.
3274.—Sutherland, W. S., Birmingham, "Improvements in and apparatus for purifying and burning gases, and in apparatus for generating combustible gases." Aug. 20, 1878.
3275.—Sutherland, W. S., Birmingham, "Improvements in means and apparatus for moving and compressing gases and fluids." Aug. 20, 1878.
3279.—Ball, A., Spalding, Lincolnshire, "Improvements in apparatus for lighting and heating." Aug. 20, 1878.
3306.—Wilkinson, C. H., Slaithwaite, Yorks, "Improvements in unions or couplings for connecting pipes." Aug. 22, 1878.

### PATENTS WHICH HAVE PASSED THE GREAT SEAL.

700.—Siemens, C. W., Westminster, "Improvements in regenerative gas furnaces or kilns and gas producers." Feb. 20, 1878.
729.—Wilson, W. P., New Cross, Loudon, "Improvements in the method, and in apparatus used in the purification of gas, parts of which apparatus are also applicable to the carburetting or measuring of gas or atmospheric air." Feb. 21, 1878.
732.—Weston, G., Sheffield, "An improved apparatus applicable to gas governors." Feb. 22, 1878.
736.—Fielding, J., Gloucester, "Improvements in fluid pressure-engines, fluid-meters, and pumps." Feb. 22, 1878.
1591.—Hislop, G. R., Paisley, and Young, W., Clippens, N.B., "Improvements in revivifying spent lime, and in the means or apparatus therefor." April 20, 1878.
1604.—Longsdon, A., Queen Victoria Street, London, "Improvements in apparatus, tools, and machinery for charging and drawing gas-retorts." April 20, 1878.

### PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

2685.—Redwood, T. B., "Improvements in the manufacture of gas." July 29, 1875.
2742.—Bucknill, J. T., and Casella, L. P., "Improvements in gauges for indicating fluid pressures." Aug. 4, 1875.
2819.—Lake, W. R., "Improvements in gas-burners." Aug. 11, 1875.
2826.—Hallewell, R., "Improvements in gas motor engines." Aug. 11, 1875.
2842.—Sugg, W. T., "Improvements in apparatus for the storeage and supply of gas." Aug. 12, 1875.


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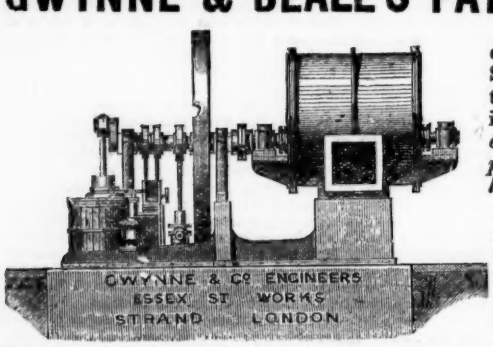


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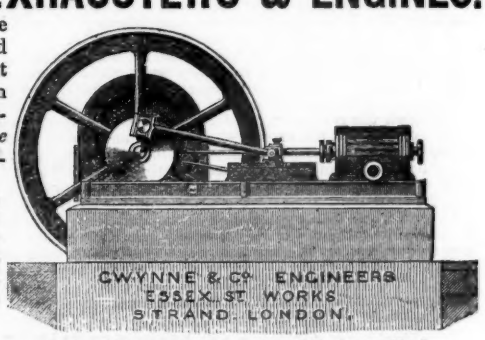


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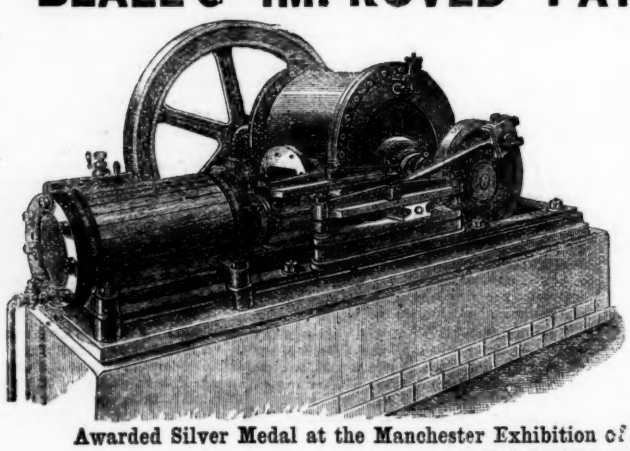

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**BOLTON CORPORATION GAS DEPARTMENT.**

ENGINEER AND MANAGER.

**THE Bolton Corporation invite applications** for the Office of Engineer and Manager of their Gas-Works. He must have a thorough practical knowledge of the Manufacture and Distribution of Gas, and will be required to devote the whole of his time to the duties of the office, and to enter thereon on Jan. 1, 1879.
Applications, stating age, qualification, present employment, and salary required, with testimonials of ability and character, to be sent on or before Sept. 17, 1878, to the undersigned, from whom further information may be obtained.

R. G. HINNELL, Town Clerk.

**ON SALE—A Station-Meter (with new** Drum), capable of passing 10,000 cubic feet per hour, with Hydraulic Valves, Bye-Pass, &c.; 10-in. Connections. Has been removed to make room for one of larger capacity.
For particulars and price, apply to GEORGE NEWTON, Gas-Meter Manufacturer, Union Street West, OLDHAM.

**ROSSENDALE UNION GAS COMPANY.**

MANAGER AND SECRETARY.

**THE Directors desire to appoint a person** competent to fill the office of MANAGER and SECRETARY of this Company. Salary £275 per annum, with house (apart from the works) rent free. He must have a thoroughly practical knowledge of the Manufacture and Distribution of Gas, and be prepared to devote the whole of his time to the discharge of his duties. He will be required to give a bond in £1000, with sureties to be approved by the Directors.
Applications, stating age, qualifications, and present employment, with testimonials of character and ability, to be sent to Captain AITKEN, Urmston, MANCHESTER, Chairman of the Directors, on or before Tuesday, Sept. 3, 1878.

**FOR SALE — One 50 ft. by 14 ft. Gas-**HOLDER, nearly new, with Columns and Girders. Price £225, a bargain.
Also a STATION-METER, in good working order, to pass 15 000 feet per hour; and Four 10 ft. PURIFIERS with Hydraulic Centre-Valve.
Apply to J. S. REEVES, Manager, Gas-Works, BILSTON.

STATION-METER FOR SALE.

**THE Gas Committee of the Rochdale** Corporation offer for SALE a STATION-METER, capacity 25,000 cubic feet per hour, 12-in. Connections, Hydraulic Valves, and Bye-Pass, and all other necessary fittings. The Meter to be removed in consequence of extensions.
Any further information thereon can be had from the Manager at the Works.
Tenders, endorsed "Tender for Station-Meter," must be sent to me on or before the 13th inst.

By order,
ZACH. MELLOR, Town Clerk.
Town Hall, Rochdale, Aug. 2, 1878.

RUSHDEN GAS-WORKS.

**THE Directors of the Rushden Gas Com-**pany are desirous of receiving TENDERS for the Erection of a new GASHOLDER, 36 ft. in diameter and 15 ft. in height.
Plans and specifications can be seen at the Works after the 28th inst.
Tenders are to be sent in to the Secretary not later than the 9th day of September next.

By order of the Directors,
W. FOSKETT.

TENDERS FOR TAR.

**THE Directors of the Cork Gas Con-**sumers Company invite TENDERS for their Surplus TAR for One year, from the 1st of September next. Probable quantity 120,000 to 140,000 gallons. Delivery on Company's Works, filled into purchaser's vessels. Payments, cash monthly.
Tenders will be received on or before the 30th of August next.

By order,
DENNY LANE, Secretary.
Company's Offices, 72, South Mall,
Cork, Aug. 10, 1878.

TAR AND AMMONIACAL LIQUOR.

**THE Directors of the Holyhead Gas** Company are desirous to receive TENDERS for their TAR and AMMONIACAL LIQUOR for One or Three years. The Contractor must undertake to forward proper railway tanks at all times during the contract, to keep down the Company's storage cisterns.
Tenders to state price per ton, and to be sent in on or before Tuesday, the 3rd of September.
The Directors do not bind themselves to accept the highest tender.

E. M. JONES, Manager.
Gas-Works, Holyhead, Aug. 22, 1878.

TENDERS FOR TAR.

**THE Directors of the Exeter Gaslight** and Coke Company invite TENDERS for their surplus TAR for One year from the 1st of October next. Probable quantity from 110,000 to 130,000 gallons. Delivery on Company's Works, filled into purchaser's vessels. Payments, cash monthly.
Tenders, endorsed "Tenders for Tar," will be received by the undersigned on or before Monday, the 16th of September next, but the Directors do not bind themselves to accept the highest or any tender.

W. A. PADFIELD, Secretary.
Gas Offices, North Street, Exeter, Aug. 22, 1878.

TO GASHOLDER MAKERS, &c.

**THE Directors of the Elland-cum-Greet-**land Gas Company are prepared to receive TENDERS for the Making and Fixing complete, at the Elland Gas-Works, of a TELESCOPE GASHOLDER, in Two Lifts, the outer lift to be 120 feet diameter and the inner one 118 feet diameter, each lift to be 20 feet in depth, and with the necessary Columns and Girders.
Plans and specifications may be seen on application to the Secretary and Manager, at the Gas Office, Elland.
Sealed tenders to be sent in on or before the 6th of September next, to the Gas Office, Elland, endorsed "Tender for Gasholder."
The Directors do not necessarily engage to accept the lowest or any tender.

W. A. WALKER, Secretary and Manager.

**BANGOR LOCAL BOARD OF HEALTH.**

TENDERS FOR GAS COAL.

**THE Water and Gas Committee for the** above Board invite TENDERS for 2500 Tons of Best Screened GAS COAL, to be delivered in such quantities and at such periods as may be required during the 21 months ending June 30, 1880.
Parties tendering must give full particulars of the Coal offered, and the colliery from which they propose the supply to be delivered (carriage paid) at the London and North-Western Railway Station, Bangor, Carnarvonshire.
Sealed tenders, addressed to the undersigned, will be received until the 12th of September next.

DAVID WHITE, Secretary and Manager.
Water and Gas Works, Bangor, Aug. 24, 1878.

**CITY OF HEREFORD.**

TO GASHOLDER MAKERS, IRON PIPE FOUNDERS, AND OTHERS.

CONTRACT No. 2.

**THE Gas Management Committee of the** Corporation of Hereford hereby invite TENDERS for the Supply, Erection, and Completion of a TELESCOPIC GASHOLDER, 82 ft. diameter and 30 ft. deep.
Copies of specification may be obtained (on payment of one guinea, which will be returned upon receipt of a *bonâ fide* tender) on application to the undersigned. The drawings will be open for inspection between the hours of Nine a.m. and Five p.m. any work day, at the Gas-Works Office.

CONTRACT No. 3.

For the supply of about
2000 lineal Yards of 16-in. Turned and Bored PIPES.
500 " 14-in. " " "
200 " 12-in. " " "
Together with a quantity of Special Castings.
Copies of specification may be obtained on same conditions as above.
Sealed tenders, properly endorsed, addressed to the undersigned, to be sent in on or before Monday, Sept. 23 next.
The Committee do not bind themselves to accept the lowest or any tender.

By order of the Committee,
WILLIAM DAVIS, Engineer.
Gas Office, Hereford, Aug. 20, 1878.

# TO GAS ENGINEERS.

## D. BRUCE PEEBLES & CO.

Beg to call the attention of Gas Engineers to the fact that the novel and original feature in connection with PEEBLES' SYSTEM OF CONTROLLING THE ACTION OF GAS GOVERNORS is the loading or acting on the Bell by Pneumatic Pressure instead of Weights.

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LEEDS CORPORATION GAS-WORKS.

**TENDERS solicited for the Purchase of** the AMMONIACAL LIQUOR that may be produced at the Gas-Works, New Wortley, during Three years commencing on the 1st of January next.

Further particulars and forms of tender may be obtained on application at the Gas-Works, Meadow Lane, or the Offices, Boar Lane.

Endorsed tenders to be sent, addressed to the CHAIRMAN, Gas Offices, BOAR LANE, not later than Wednesday, the 18th of September next.

---

TO GAS APPARATUS MANUFACTURERS.

**THE Buxton Local Board invite tenders** for the Supply and Fixing of four PURIFIERS, 14 ft. square, and a CENTRE-VALVE with 12 in. connections.

The plan may be seen, and specification and form of tender obtained, on application to Mr. G. SMEDLEY, Gas Office, Buxton.

Tenders, endorsed "Purifiers," addressed to the Chairman of the Gas Committee, to be forwarded not later than the 5th of September next.

The Board do not bind themselves to accept the lowest or any tender.

Buxton, Aug. 22, 1878.

---

**BOROUGH OF DOVER.**

TO COAL MERCHANTS AND OTHERS.

**THE Town Council invite tenders for** the supply of about 1000 Tons of STEAM FUEL, to be either—

1. The best Smokeless Steam Coal; or,
2. Coke of Newcastle Coal, hard and free from breeze and moisture.

The Coal to be delivered, 250 Tons not later than the 1st of October next, and the remainder in such quantities as may be arranged with the Town Surveyor, but so that there shall be not less than 100 Tons in stock at any time, the consumption being at the rate of about 16 Tons per week.

Tenders to state price per ton (including freight and all charges except Dover Local and Harbour dues) delivered into carts free alongside the quay at Dover. Also the name and neighbourhood of the colliery, and the name of the seam from which the Coal will be supplied. And also if the Coal will be large hand-picked or unscreened rubble, or comprise any and what proportions of either, and, if any unscreened rubble, what proportion of dust. No tender will be accepted which does not contain these particulars.

Two weeks prior to the arrival of any Coals, a certificate from the owner or manager of the colliery shall be produced to the Town Surveyor, to prove that the Coals about to be delivered are in accordance with the contract.

Particulars as to the Coke will be supplied on application.

The Surveyor to have power to reject any which may not, in his opinion, be in accordance with the terms of the contract.

Payments within two months of date of Surveyor's certificate.

If default in any delivery, Contractor to be liable to a penalty of £1 per day, and Council may procure any sort of fuel elsewhere at the expense in all things of Contractor.

Contractor to execute contract and bond (in one-fourth of amount of tender) with one or more sureties, to be prepared by the Town Clerk at the expense of the Council.

Tenders (on forms to be obtained at my Office), marked "Tender for Fuel," to be delivered at the Town Clerk's Office, Dover, before Two p.m. on Wednesday, the 4th of September next.

The Council do not bind themselves to accept the lowest or any tender, and are to be at liberty to accept the whole or part of any tender.

By order,
WOLLASTON KNOCKER, Town Clerk.
Town Clerk's Office, Dover, Aug. 22, 1878.

---

**A PAMPHLET ON DIP-PIPES, &c.,** post free 6½d., on application to W. WHITE, Gas-Works, Abersychan, MON. See Reviews in the *Gas Trade Circular and Review*, March 29, 1878, and *Design and Work*, March 30, 1878.

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TO INVENTORS AND PATENTEES.

**MR. W. H. BENNETT, having had** considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.

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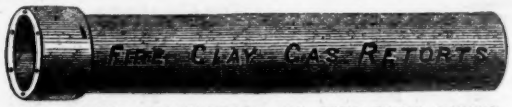


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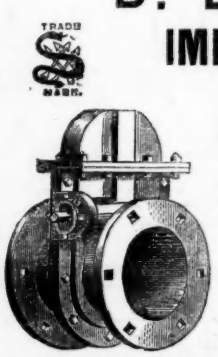

List of prices, with full dimensions of all sizes up to 48-inch, to be had on application.

These Valves are proved on both sides to 30 lbs. on the square inch before leaving the works, and are kept in stock.

In ordering Valves, please state whether required for under or above ground, and if to be with flanges or spigots and sockets cast on, or with separate spigot and socket pieces.

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THE LAW UNION FIRE AND LIFE INSURANCE COMPANY, of No. 126, Chancery Lane, London, grants Policies of Insurance on Gas-Works, and Buildings connected therewith, which cover risk of explosion and spontaneous ignition of Coal, on very advantageous terms. Full particulars will be sent post free on application to
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**Public Accountant,**
**15, UNION COURT,**
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T. Stone, Esq., of Weymouth, writes on Nov. 17, 1876: "I have used about 12,000 tons of this Coal, with, I think, the best possible results, although not always under the most favourable circumstances. My Coal account made up to Midsummer last showed a makeage of 10,524 cubic feet per ton of 14¼-candle gas, and not a hundredweight of Cannel used. This statement would, I know, be incredible to many men, and may provoke the remark, 'How much of it is paid for?' For the gratification of such, I have to say that, of the above quantity, 9866 cubic feet per ton of Coal carbonized were brought to charge and duly paid for, with the exception of about 6s. per cent. for bad debts. The coke is of excellent quality. The above facts I hold to be a greater recommendation to your Coal than any words of mine could be."
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Mr. ROMANS has for upwards of 30 years been practically engaged in the Manufacture of Gas, and has, by extensive experiments, ascertained that by JUDICIOUS INTERMIXTURE of the lighter with the heavier gases, much of the rich Hydrocarbons CAN BE SAVED, which otherwise ARE LOST, during the process of manufacture. He is therefore enabled to give advice to those who favour him with their orders for Cannel, as to the class which will secure for their standard of illuminating power the HIGHEST ADVANTAGEOUS RESULTS.
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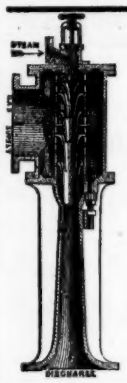

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AND EVERY DESCRIPTION OF
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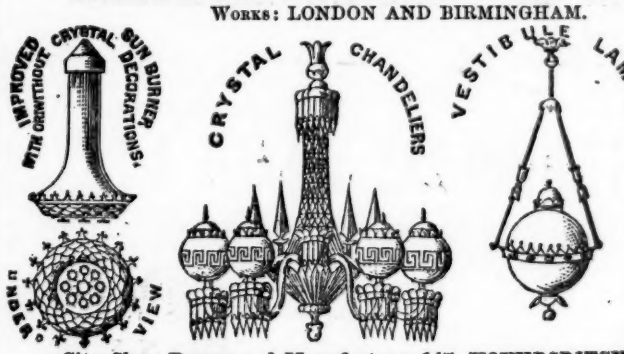
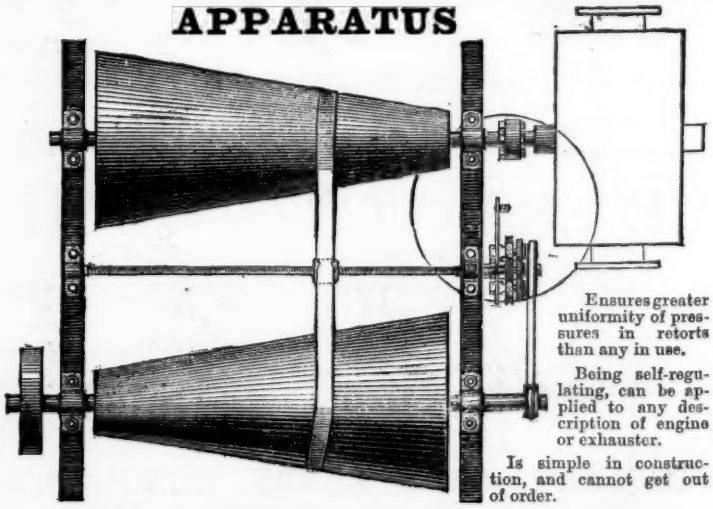
WORKS: LONDON AND BIRMINGHAM.

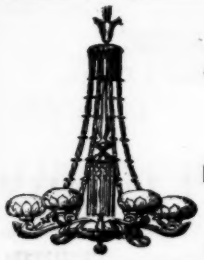



GAS MOONS,
Cut and Engraved, of the newest designs
GAS REFLECTORS
In Silver and Glass
GAS NIBS
AND
BURNERS
Of every description.
Pattern-Books of Gas-Fittings, Crystal and Ormolu Chandeliers for 1876, are now complete.
City Show-Rooms and Manufactory, 147, HOUNDSDITCH, LONDON.
ESTABLISHED 1830.

**FISON'S PATENT SELF-REGULATING GAS-EXHAUSTING APPARATUS**



Ensures greater uniformity of pressures in retorts than any in use.
Being self-regulating, can be applied to any description of engine or exhauster.
Is simple in construction, and cannot get out of order.
**JASPER & WM. SNOWDON, Manufacturers,**
OLD BANK CHAMBERS, PARK ROW, LEEDS.
*Full Particulars, Testimonials, Descriptive Circulars, Estimates, &c., on application.*



## F. & C. OSLER,

**45, OXFORD STREET, LONDON, W.**

MANUFACTORY AND SHOW-ROOMS:

BROAD STREET, BIRMINGHAM.

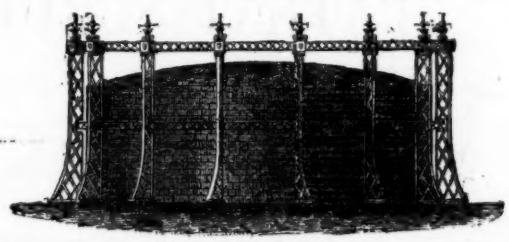
ESTABLISHED 1807.

**MANUFACTURERS OF CRYSTAL GLASS CHANDELIERS.**

WALL LIGHTS, AND LUSTRES FOR GAS AND CANDLES.

**TABLE GLASS OF ALL KINDS.**

CHANDELIERS IN BRONZE AND ORMOLU. MODERATOR LAMPS.



## THE HORSELEY COMPANY,

**LIMITED,**

TIPTON, STAFFORDSHIRE.

LONDON OFFICE:

**6, WESTMINSTER CHAMBERS, VICTORIA STREET,**

GAS ENGINEERS, IRONFOUNDERS, &c.,

MANUFACTURERS OF

**GASHOLDERS, WROUGHT AND CAST IRON TANKS, CONDENSERS, PURIFIERS, SCRUBBERS, MAINS, RETORT-LIDS, PLAIN AND DISHED LAMP-POSTS, PIPES,**

AND ALL REQUISITES FOR EITHER

## GAS OR WATER WORKS;

ALSO

**MAKERS OF ROOFS, BRIDGES, &c.**

## S. OWENS & CO.,

**WHITEFRIARS STREET, FLEET STREET, LONDON, E.C.,**

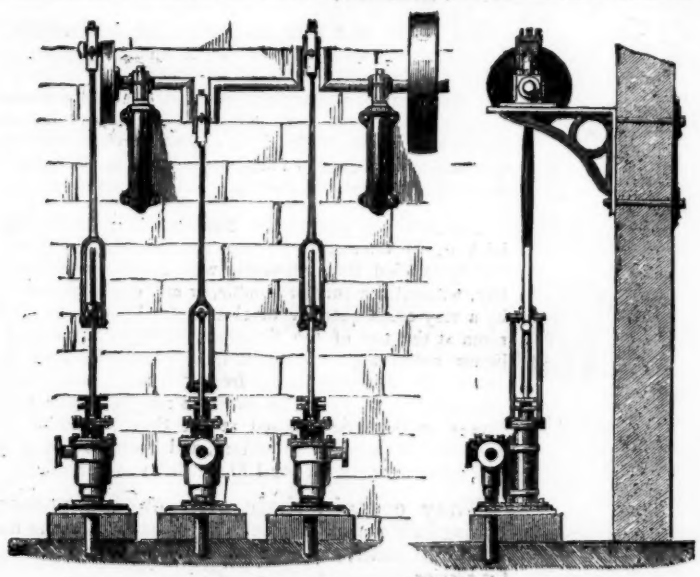
Hydraulic Engineers,

AND MANUFACTURERS OF

## PUMPING MACHINERY of every Description.

SOLE LICENSEES AND MANUFACTURERS FOR GREAT BRITAIN OF

**BLAKE'S PATENT DIRECT-ACTING STEAM-PUMPS.**



IMPROVED DOUBLE-ACTION PUMPS.

For Water. For Tar. For Ammoniacal Liquor.

This illustration shows an arrangement of three (No. 179) Improved Double-Action Pumps driven from the same crank-shaft, as frequently supplied for use in Gas and Chemical Works. The suction and discharge pipes can be arranged for drawing from and delivering in any required direction.

**These Pumps have been supplied to nearly all the large Gas Companies and Chemical Works, both for Pumping Water, Tar, and Ammoniacal Liquor.**

GAS SYPHON PUMPS, IN COPPER OR SHEET IRON, ALWAYS IN STOCK.

**Illustrated Catalogues sent post free on application.**

## JAMES OAKES & CO.,

ALFRETON IRON-WORKS, DERBYSHIRE,

AND

WENLOCK IRON WHARF, 21 & 22, WHARF ROAD, CITY ROAD, LONDON, N.,

Keep in London and at their works large stocks of PIPES and CONNEXIONS (1½ to 36 inches in diameter); also make and supply Retorts, Tanks, Columns, Girders, Special Castings required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.

CHARLES HORSLEY, Agent.

THE

## SILICA FIRE-BRICK CO.,

OUGHTIBRIDGE

Near SHEFFIELD,

Manufacturers of THE ORIGINAL SILICA OR DINAS FIRE-BRICKS. Specially adapted for Gas-Retort Furnaces and for Siemens's Gas-Furnaces. Shipments promptly executed to London, Liverpool, Hull, Grimsby, &c.

## TROTTER, HAINES, & CORBETT,

BRETTELL'S ESTATE

FIRE CLAY & BRICK WORKS,

STOURBRIDGE.

Manufacturers of GAS-RETORTS, GLASS-HOUSE FURNACE & BLAST-FURNACE BRICKS LUMPS, TILES, and every description of FIRE-BRICK.

Proprietors of

BEST GLASS-HOUSE POT and CRUCIBLE CLAYS.

Successors to

E. BAKER AND CO., LATE BRIERLEY HILL, STAFFORDSHIRE.

## HARPER & MOORES,

PROPRIETORS OF THE

**BEST STOURBRIDGE CLAYS,**

STOURBRIDGE.

Manufacturers of all Descriptions of

BEST STOURBRIDGE FIRE-BRICKS, LUMPS, AND CLAY RETORTS

Of all Dimensions for Gas-Works,

GLASS-HOUSE POTS & CRUCIBLES

Of every kind.

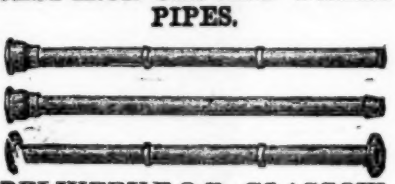
The Highest Award was obtained by H. & M., at the Philadelphia Exhibition, 1876, for Superior Quality of Manufacture.

## GAS AND WATER PIPES.

**WILLIAM MACLEOD & CO.,**

**23 & 25, OSWALD STREET, GLASGOW.**

**CAST-IRON GAS AND WATER PIPES.**



DELIVERY F.O.B., GLASGOW.

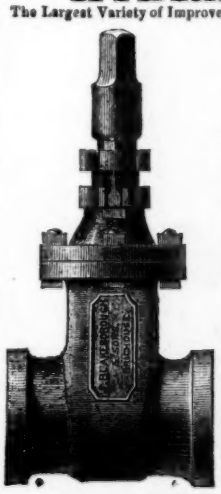
*Prices on application.*

## SLUICE VALVES.

The STRONGEST, CHEAPEST, & BEST in the TRADE.

## HYDRANTS.

The Largest Variety of Improved Designs in the Market.



SPECIALITIES.

SLUICE VALVES for Water.
DO. for Gas and Sewage, 1½ to 48 in.
RESERVOIR SLUICES
AIR VALVES.
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BALL VALVES.
Compound HYDRANTS.
Straight-way Do.
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Ball Do.
Sluice-Valve Do.
STAND POSTS, various.
STREET WELLS.
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Tested with 600 to 1000 feet head of pressure.

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COMMERCIAL BRASS AND IRON WORKS, } BRIGHOUSE,
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Contractors to the British and Indian Governments.

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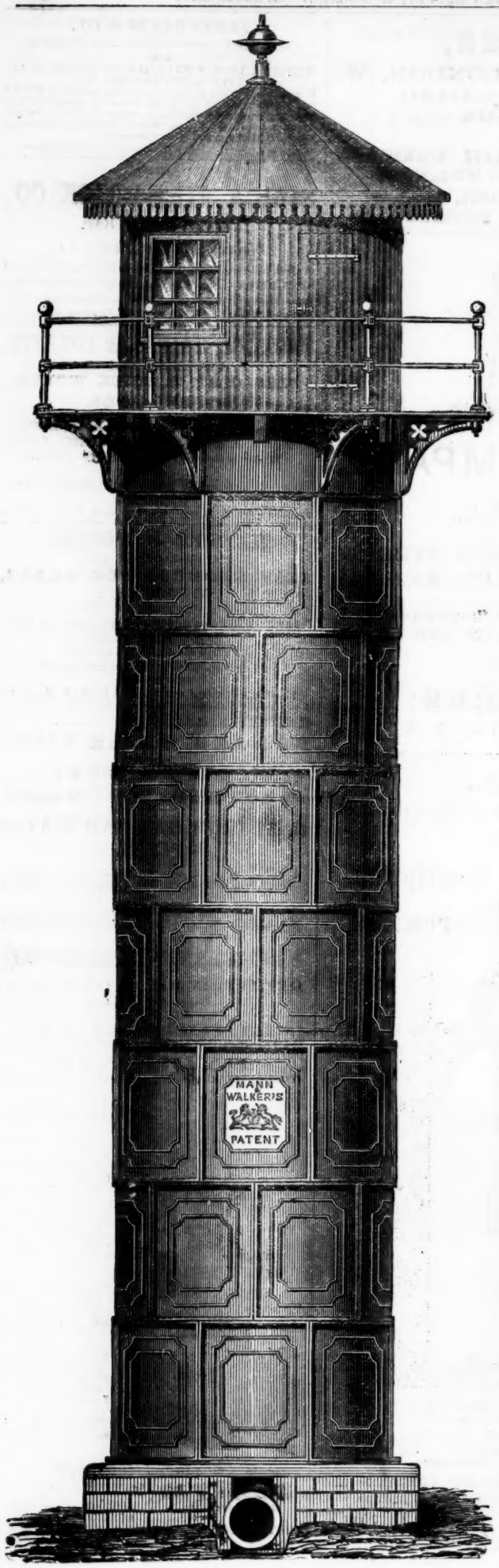
Where Samples may be seen.




C. & W. WALKER,
8, FINSBURY CIRCUS,
LONDON, E.C.

# MANN & WALKERS' PATENT SCRUBBER.

**By Letters Patent in Great Britain, Europe, and the United States of America.**

**By some important improvements recently** patented, the purifying power of these Scrubbers has been much increased, and a stronger ammoniacal solution obtained, which is found to absorb a large portion of the carbonic acid contained in gas, effecting an important saving in money and labour in the lime purifiers, and where oxide only is used, the increase in the illuminating power of the gas obtained by these Scrubbers is shown in a remarkable degree, in consequence of the large quantity of carbonic acid removed from the gas.

**It is to be particularly noted that the im-** portant results of these Scrubbers do not depend upon the machinery alone. The entire internal construction of the Scrubber bears an almost equally important part. For this reason, where it is desirable to convert existing Scrubbers, whose dimensions happen to be suitable, the work commences by ripping out the whole of the interior of the shell, and beginning the internal construction *de novo* from bottom to top.

**Fifty million cubic feet of gas per 24 hours** are purified from ammonia by these Patent Scrubbers in a winter's day in the gas-works of London, where the purity of gas supply is the highest in the world, under the chemical restrictions of the Board of Trade.

**Generally, wherever a high standard of** purification is maintained in the chief cities and towns of the British Provinces and of Europe, these Scrubbers have become established.

**By their use the department of purification** from ammonia upon a gas-works is made complete, without the aid of prepared oxide of iron, chemicals in purifiers, or any other supplementary process, and the whole ammoniacal residual product contained in the coal is absorbed and obtained in the form most profitable to a gas company, while the requirements of all Acts of Parliament and of the Board of Trade, relating to incorporate gas companies, are satisfied.

**Foul Gas, properly condensed, entering the** inlet is, by once only passing through the Scrubber, completely purified from ammonia with regular certainty day by day, without any further trouble, or any other process, effected by a very small quantity of clear water let into the machinery room at the top of the Scrubber, which is discharged at the liquor outlet at the bottom, from Newcastle coal at about 18 to 20 ounces strength, from Yorkshire and other coals, generally from 25 to 30 ounces strength; while acidulated litmus or turmeric exposed at the Scrubber outlet will not show the slightest discoloration, and there is not a quarter of a grain of ammonia per 100 feet left unabsorbed.

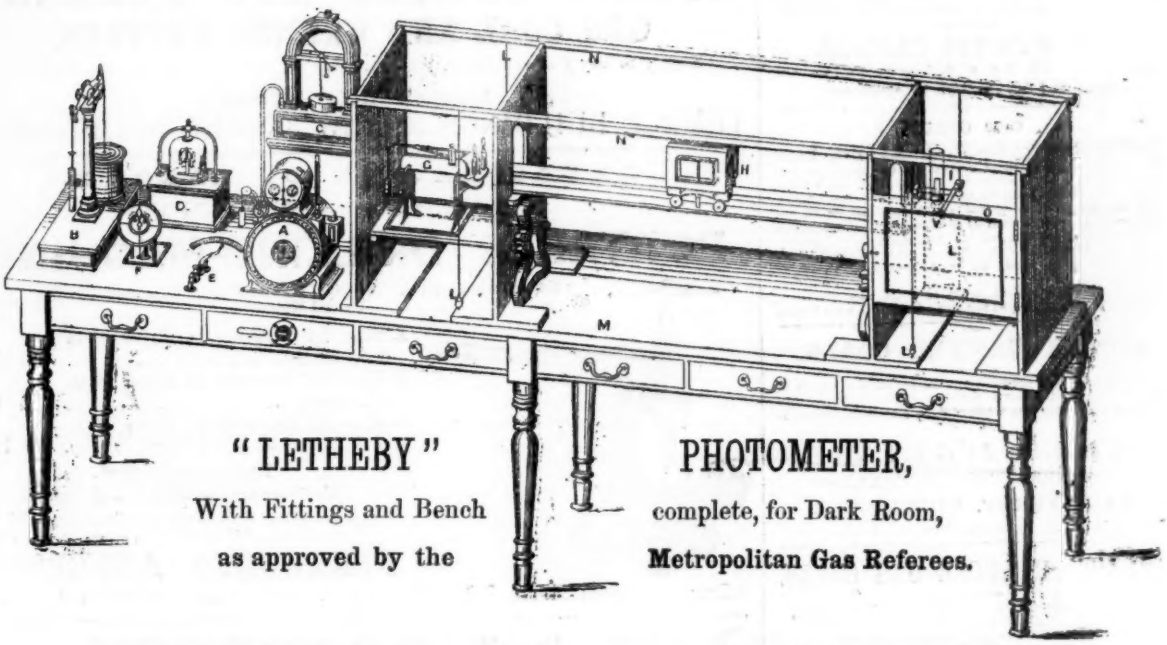
**They contain their own engine power, re-** quiring only a small inappreciable quantity of steam from the gas-works boiler, and are then complete in themselves, ready for service.

**Applications relating to dimensions and** prices should be addressed to us, C. AND W. WALKER, 8, FINSBURY CIRCUS, LONDON, E.C., or to Mr. WILLIAM MANN, late Superintendent of the Chartered Gas-Works, BLACKFRIARS, LONDON; they should state approximately the largest make of gas in 24 hours on a winter's day, and the smallest make on a summer's day, to be purified.

# WILLIAM SUGG,

## GAS ENGINEER,

## VINCENT WORKS, WESTMINSTER, S.W.



"LETHEBY" PHOTOMETER,

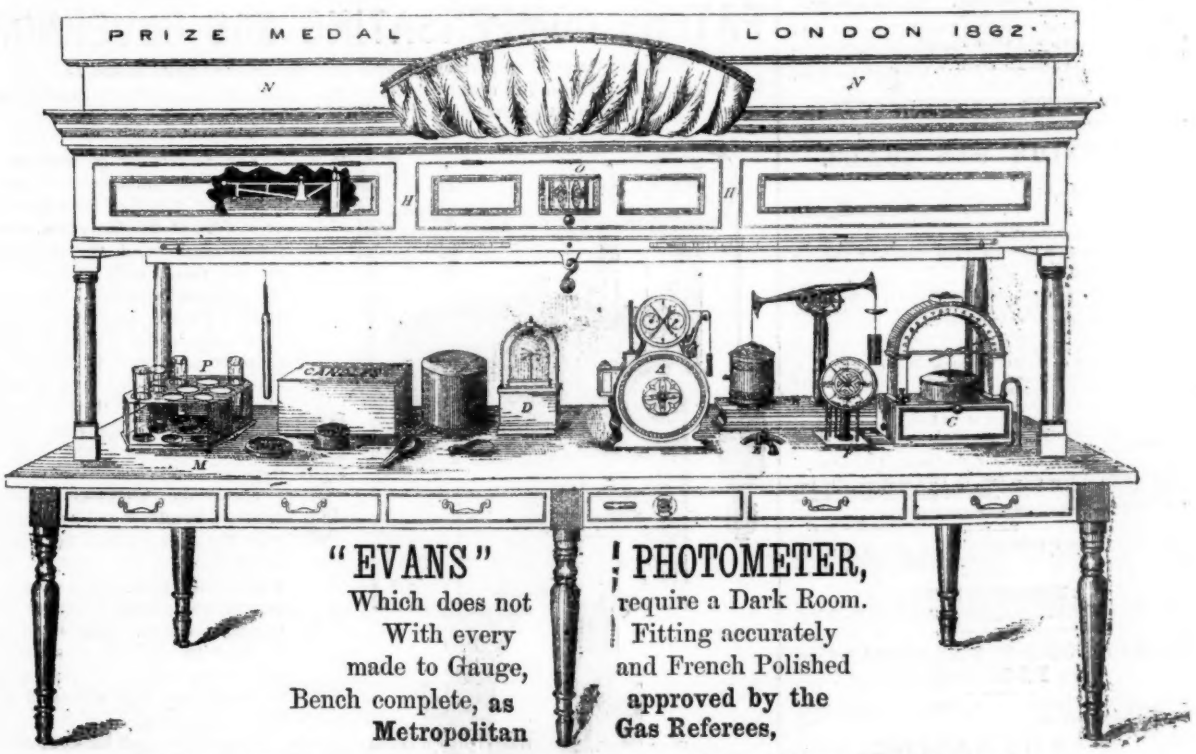
With Fittings and Bench complete, for Dark Room,

as approved by the **Metropolitan Gas Referees.**

## IMPROVED LOWE'S JET PHOTOMETER.

## WILLIAM SUGG'S PATENT ILLUMINATING POWER METER.

**All Kinds of Gas-Testing Apparatus of the most approved forms.**




"EVANS" PHOTOMETER,

Which does not require a Dark Room.

With every Fitting accurately

made to Gauge, and French Polished

Bench complete, as **approved by the**

**Metropolitan Gas Referees,**

**And as supplied and fixed by me at the Metropolitan Testing-Stations.**

**Price Lists and all Particulars on application.**

## ROBERT MARSHALL,

CANNEL COAL MERCHANT,

198, ST. VINCENT STREET, GLASGOW.

### SHOTT'S BOGHEAD.

### LOTHIAN'S CANNEL

Yields 12,500 cubic feet of 34-candle gas per ton, and 9 cwts. of excellent coke, containing only 4 per cent. of ash.

### MUIRKIRK, No. 1, CANNEL

Yields 12,160 cubic feet of 32·5-candle gas per ton, and 10 cwts. of excellent coke, containing only 5 per cent. of ash.

### OLD WEMYSS CANNEL

Yields 13,320 cubic feet of 32·5-candle gas per ton.

*Prices and full Analyses on application.*

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GAS COAL.

POPE & PEARSON, LIMITED, have now the authority of several of the most eminent Gas Engineers of London in stating that their Coal yields *in practical working over* 10,000 *cubic feet of gas, with an illuminating power of* 16 *candles;* or by the standard burners now used by the London Gas Companies, an illuminating power equal to 17½ candles.

One ton yields 12½ cwt. of good coke. This Coal can be shipped from Hull, Goole, Liverpool, Morecambe, and Barrow.

For further particulars, apply to POPE AND PEARSON, LIMITED, West Riding and Silkstone Collieries, near LEEDS.

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## SCOTCH CANNEL COALS.

The Subscriber is prepared to contract for the supply of all the principal SCOTCH CANNEL COALS. Prices and Analyses of the various Coals will be forwarded on application.

JAMES M'KELVIE,

CANNEL COAL MERCHANT,

HAYMARKET, EDINBURGH.

*Established* 1840.

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## DEAN'S PRIMROSE GAS COALS.

*South Metropolitan Gaslight and Coke Company, London, July* 12, 1878.

The Owners of the Dean's Primrose Colliery.

Dear Sirs,—I have much pleasure in stating that this Company have regularly used your Coals for more than thirty years, and that in all essential particulars they give the most satisfactory results.

The yield of Gas is from 9700 to 9800 feet per ton, of full 16 candles illuminating power, tested by the London Referees Standard Burner; and the Coke is of very good quality, while the quantity is about 40 bushels to the ton of Coal.

I consider Dean's Primrose Coals to rank amongst the first-class Gas Coals from the Durham Coal-Field.

Yours truly, GEORGE LIVESEY.

These Coals are also used by The Gaslight and Coke Company (London), and other English and Foreign Gas Companies.

Steamers loaded with quick despatch in the River Tyne. Price and other terms on application at the

FITTING OFFICE, NEWCASTLE-ON-TYNE.

---

## HOLMSIDE GAS COALS.

*South Metropolitan Gaslight and Coke Company, 589, Old Kent Road, London, S.E., Oct.* 9, 1873.

At the request of Mr. Hedley, the owner of the Holmside Colliery, I have much pleasure in stating that, for about ten or twelve years past, this Company has taken at least half of its supply of Newcastle Coal from him. I can, therefore, confidently bear testimony to the good quality of the Holmside Coals, and consider they are equal to the best of the Newcastle Coals, in proof of which I may state that this year we are using those Coals exclusively, that the yield of Gas is from 9700 to 9800 feet per ton, and that the quality of the Gas, without any admixture of Cannel, is over 16 candles, as tested by the officer appointed by the Metropolitan Board of Works, using the London Gas Referees test.

The Coke is of excellent quality, and in quantity amounts to about 40 bushels from a ton of Coal.

The annual consumption of Coal amounts to about 75,000 tons.

GEORGE LIVESEY, Engineer and Secretary.

P.S.—I am at this date, Feb. 15, 1875, still using Holmside Coals as largely as ever, and am quite as well pleased with them as when I gave the above certificate.

GEORGE LIVESEY.

We are this year, 1878, using 80,000 tons of Holmside Coal. GEORGE LIVESEY.

FITTING OFFICE:

Address, 75, QUAYSIDE, NEWCASTLE-ON-TYNE

---

## M. BREMOND'S NAPHTHALINE PROCESS.

All negotiations respecting M. Brémond's patented process for preventing Deposits of

NAPHTHALINE

in Gas Main and Service Pipes should be addressed to Mr. W. H. BENNETT, 22, Great George Street, WESTMINSTER, S.W., or to M. BREMOND, Gas Engineer, Compania Madrilena de Alumbrado y Calefaccion por Gas, MADRID, who may be consulted upon all matters connected with the Gas Industry.

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## FERRAND DAVIES,

148 GRESHAM HOUSE, OLD BROAD STREET, LONDON, E.C.,

AGENT FOR

THOMAS BARR'S LESMAHAGOW MAIN CANNEL,

AND

NEWTON, CHAMBERS, & CO.'S SILKSTONE GAS COALS.

Analyses and Quotations on application.

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## WILSON CARTER AND PEARSON,

GAS COAL AND CANNEL FACTORS,

Supply to any Railway Station or for Export all kinds of Fuel for Gas purposes.

Address—CHIEF OFFICES:

TEMPLE BUILDINGS, 50, NEW STREET, BIRMINGHAM.

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GREAT SAVING OF LABOUR.

ENOCH'S PATENT

## PORTABLE DRILLING-MACHINE,

Now in use by all the Principal Gas and Water Companies in the United Kingdom.

| | |
|---|---|
| E Size, for Services in Pipes, 2 to 3 in. bore . . . . . | £3 10 0 |
| F Size, for Services in Pipes, 2 to 4 in. bore . . . . . | 4 0 |
| G Size, for Services in Pipes, 2 to 6 in. bore, with Telescope Cramp. | 4 10 0 |

Drills, 1s. 6d. each.

Machines sent on approval, if desired.

*Prices for other Sizes and Modifications, with full Particulars and Testimonials, on application to*

ALEXANDER ANDERSON,

Office: 9, London Street, E.C. Warehouse: Vine Street, Minories, London, E.

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## J. & J. BRADDOCK,

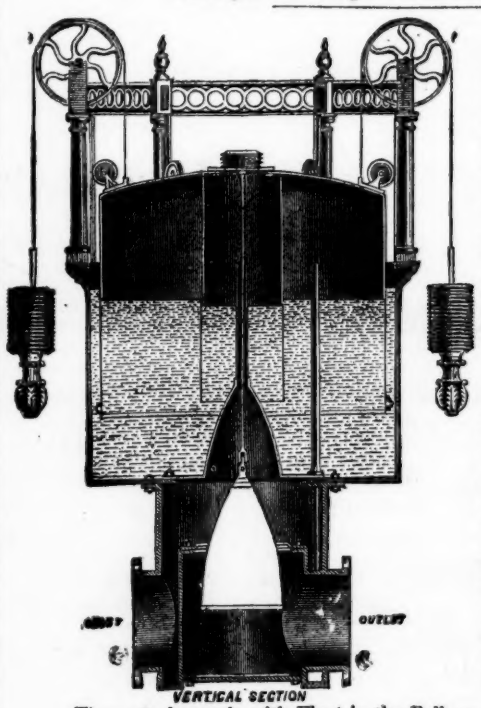
GLOBE METER-WORKS,

OLDHAM,

Beg to submit to Gas Engineers their

## PATENT COMPENSATING GAS GOVERNOR,

Which is designed to give an uniform pressure at the Outlet to the Main at all draughts up to the full quantities which the Governors are made to control, such outlet pressure being less than the initial pressure.




VERTICAL SECTION

The uniformity of pressure is obtained by introducing a compensating chamber into the Bell or Holder of the Governor, which compensator is of the same area as the valve, both of which are operated on by the initial pressure, thereby placing the valve in equilibrium, no matter what the initial pressure may be. The action on the Bell is by the Gas passing along a pipe from the outlet, and the pressure is regulated by weights in connexion with the Bell as required.

From the sectional elevation attached hereto, it will be seen that only the Gas required to operate the Bell comes in contact with the water of the tank, which water will remain comparatively sweet and free from odour. That in case of accident to the Bell, no more Gas can escape than would pass up the pipe covering the valve-rod and Bell supply-pipe.

These Governors have been made and sent out of various sizes for from 2 to 24-inch Mains, and give most satisfactory results.

They can be made with Float in the Bell, or counterpoise as per section.

# THE SILKSTONE & DODWORTH COAL & IRON COMPANY, LIMITED,

**DODWORTH, BARNSLEY.**

BENJAMIN WHITWORTH, Esq., M.P. . . . . Chairman.
Mr. RICHARD HARTLEY . . . . . Managing Director.

## REAL OLD SILKSTONE GAS COAL.

**JAMES PATERSON Esq., Gas Engineer, of the Warrington Gas Company, reported, Aug. 10, 1875:—**

"This Coal possesses remarkable qualities as a gas and coking coal, and appears SECOND TO NONE IN THE KINGDOM. It contains the large quantity of 699 lbs. of illuminating matter, and 1498 lbs. of coke to the ton, and produces **12,240** cubic feet of 16·66 candle gas."

The above Company are raising nearly a thousand tons of the Real Old Silkstone Gas Coal per working day.

**PRICES QUOTED TO ANY RAILWAY STATION, OR F.O.B. HULL, GRIMSBY, GOOLE, KEADBY, LIVERPOOL, AND FLEETWOOD.**

1862.

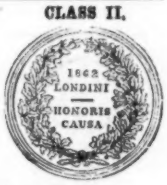
## HALLETT'S PATENT ANTIMONY PAINT.

MADE ONLY BY

**GEORGE HALLETT & CO.,**

**296, ROTHERHITHE, LONDON, S.E.**

CLASS II.




This Paint having been in general use over sixteen years (especially in some of the principal Gas-Works), and proved itself the best light-coloured Paint produced for resisting the influence of vitiated atmospheres, it is important that its qualities should be more widely known. Its advantages are that—

It does not require DRIERS like other Paints.

It does not poison the painter like white lead. No colic by its use.

It has greater durability in colour, as sulphurous gases do not blacken it as they do white lead.

It is of a light stone colour, and has a body equal to white lead, and as its specific gravity is so much less, it covers equally well one-third more surface, by which a great saving is effected; a similar economy arises from its use in steam and gas joints, for which purpose it is superior to white lead.

Established

**1795.**

## JOSEPH CLIFF & SONS,

THE ORIGINAL

WORTLEY FIRE-BRICK WORKS,

**NEAR LEEDS,**

**London Wharf: No. 4, inside Great Northern Goods Station, King's Cross, N.;**

**LIVERPOOL: Back Leeds Street.**

SPECIAL NOTICE.—Our Patent Machine-made Retorts have now been in *actual work* nearly 1000 days, and are yet in good order. References on application.

*July* 2, 1877.

# NEWTON, CHAMBERS, & CO.,

## THORNCLIFFE IRON-WORKS AND COLLIERIES,

NEAR SHEFFIELD.

## CELEBRATED SILKSTONE GAS COALS.

**The various descriptions of Gas Coal produced from the above Collieries possess an unequalled reputation, combining in a large degree the constituents essential for the production of the best quality of Coke and Gas of a high illuminating power.**

**A recent extensive development of the Collieries enables us to offer increased supplies.**

**JAS. PATERSON, Esq., of Warrington, after testing various qualities of our Coal, has sent the following testimony of their merits:—**

"*Warrington Gaslight and Coke Company,*
*Offices, Mersey Street, Warrington, April* 23, 1877.

"MESSRS. NEWTON, CHAMBERS, AND CO.,

"GENTLEMEN,—After carefully testing the various samples of Gas Coals sent from your Collieries for analysis, I have pleasure in reporting them as belonging to the highest class of Gas and Coking Coals.

"The average of Nine samples gives a yield of **12,500** cubic feet of **15½**-Candle Gas, being equivalent to **664** lbs. of sperm per ton, and **1420** lbs. of fixed carbon of a very superior quality. All the samples bear a close relation to each other in value.

"Yours truly, "JAMES PATERSON."

**Full particulars will be sent on application to us—address as above.**

# NEW PATENT WET GAS-METER,

## THE "RELIANCE,"

MANUFACTURED BY THE

## GAS-METER COMPANY, LIMITED,

238, KINGSLAND ROAD, LONDON; UNION STREET, OLDHAM; HANOVER STREET, DUBLIN.

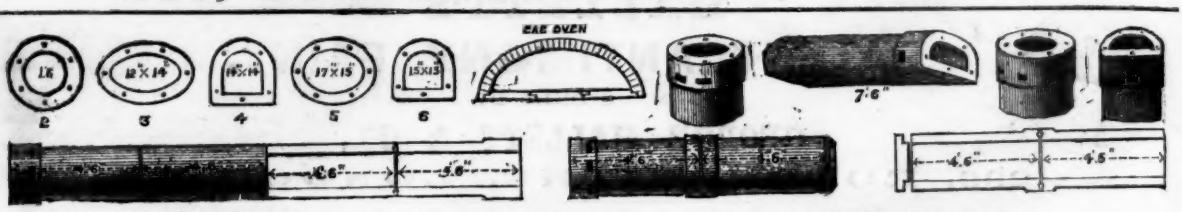
The object attained by this invention is the *correct measurement of Gas under every fluctuation of the pressure.*

Accuracy is obtained by subjecting the whole of the water which determines the measuring chambers of the drum to one uniform even pressure, and so prevents unequal displacements of the water-line.

The "RELIANCE" METER has been tested by several of the most experienced official meter inspectors. Copies of their reports may be obtained on application to the

GAS-METER COMPANY, LIMITED,

238, KINGSLAND ROAD, LONDON.




## HARRIS & PEARSON, STOURBRIDGE,

Proprietors of Best Clay Mines. Largest makers in the World of Gas-Retorts, Lumps, Tiles, Fire-Bricks, and Fire-Clay Goods of all kinds. Large Stock of Retorts always on hand. Orders for any Size executed on receipt.

## CAST-IRON GAS AND WATER PIPES,

WROUGHT IRON AND LEAD TUBING, GLAZED DRAIN-PIPES,

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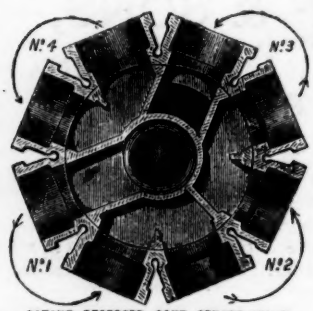


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*Sectional Plan.*

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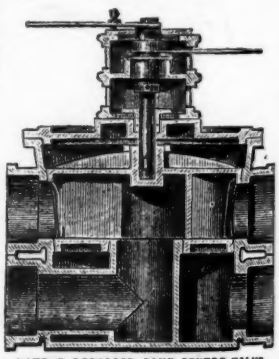

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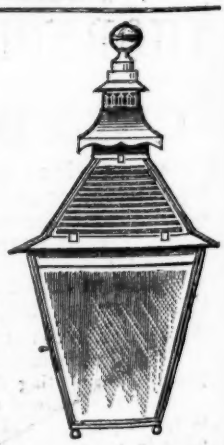


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